

and are now in operation in the BART system. While at Westinghouse, I was also Engineering Manager of the Propulsion Project related to C2 cars, which were manufactured and produced pursuant to design specifications prepared by BART. These cars are also now in use in the BART system.

3. I am the Manager of BART's Vehicle Maintenance Engineering Department. In this position, along with my previous work developing train cars consistent with BART design specifications, I am intimately familiar with the all BART train cars design specifications.

4. From my review of the business records kept by BART, specifically, the BART Accident-Injury Report, the BART Preliminary Incident Report and the related Maintenance and Reliability Information System report (attached as Exhibits A, B and C), it is my understanding that Ms. Nash fell between the 4th and 5th cars of a nine car train. The 4th car was car # 439, a C1 Car. The 5th car was car # 2503, a C2 Car.

5. In 1982, BART purchased the C1 train cars pursuant to BART approved Contract No. 42AA-110 [1982 Contract]. Internal licensed engineers with BART prepared the design specification that went into this contract, which were approved by BART, and sent out for bid. The C1 cars were manufactured by Soferval/Alsthom Atlantique in 1989.

6. In 1992, BART introduced the C2 train cars. A lengthy design and manufacturing process preceded the introduction of the C2 cars. The design specification approved by BART that were sent out for bid are contained in Contract No. 42DA-110 [1992 Contract.] A true and correct copy of the relevant portions of the 1992 Contract are attached hereto as Exhibit D. The design drawings associated with the C1 and C2 Car ends are attached as Exhibit E.

7. The BART procedure for the purchase of newly designed train cars is a multi-step quality assurance process. First, the BART engineering staff prepares the design specifications to be put out to bid. These specifications are checked by many engineering professionals to ensure the highest safety, quality and that the specifications are compatible to the ongoing BART system parameters. Second, after approval by the BART board of directors, the design specification contract is put out to bid.

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DECLARATION OF HENRY KOLESAR IN SUPPORT OF DEFENDANT'S MOTION FOR SUMMARY JUDGMENT, OR ALTERNATIVELY,
PARTIAL SUMMARY JUDGMENT

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Qualified contractors bid for the contract. As part of this process, the contractors' engineering staff reviews the design specifications. Third, the contract is awarded to the qualified contractor. Fourth, the contractor submits train cars pursuant to the bid specifications. Fifth, the submitted train cars are tested by outside engineers and BART professionals to ensure that the train cars have complied with design specifications and are compatible to operate within the ongoing BART system parameters. Sixth, if the train cars pass the testing, they are accepted by BART and put into the system.

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8. In regard to the C2-Cars, the initial specifications were prepared by licensed BART engineers. The specifications were then sent out for industry review to various car builders. The bid package was reviewed by Booz Allen Hamilton, a global engineering consulting firm. Meetings were then held with potential car builders to discuss the specifications. The Contract Book - Technical Provisions for the Procurement of Transit Vehicles was completed in August of 1991 and advertised for bid at that time. Technical proposals were submitted by three different companies in December of 1991. The technical proposals were evaluated by a technical evaluation committee. A Best and Final Offer was issued. After Best and Final Offers were received an additional technical evaluation was completed.

9. The BART Board of Directors then authorized the General Manager to award the Contract to Morrison Knudsen Corporation. Attached hereto as Exhibit F is a copy of the Executive Decision Document relating to the C2 train cars which outlines the procedure followed by BART in procuring the C2 Cars and documents the BART Board of Director's approval of the design of the C2 Cars. The documentation and process associated with the purchase of the C2 Cars is substantial evidence of the reasonableness of the design of the C2 Cars.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct. Executed this 12th day of February 2008 in Oakland, California.


HENRY KOLESAR

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DECLARATION OF HENRY KOLESAR IN SUPPORT OF DEFENDANT'S MOTION FOR SUMMARY JUDGMENT, OR ALTERNATIVELY,
PARTIAL SUMMARY JUDGMENT

Dec(HK)MSJ.doc C 05 5307 VRW

EXHIBIT “A”

BAY AREA RAPID TRANSIT DISTRICT

ACCIDENT-INJURY REPORT

FILE NO.

DATE OF REPORT

IDENTIFY:

☒ ACCIDENT☒ INJURY

INSTRUCTIONS: This report is to be used for reporting accidents — property damage or injury occurring to other than district personnel.

- Render all necessary assistance.
- Obtain name, age, and address of injured.
- Obtain names and addresses of witnesses when possible.
- Promptly complete this report using the reverse side if necessary.
- Forward completed report immediately as per distribution below.

- Date of Accident/Injury: 8/1/07 Mo. 10 Day 32 Yr. 2007 Were you an eyewitness? ☐ YES ☒ NO
- Identify injured person or owner of property damaged:
Name Patricia Anne Nash Age 56 Address 901 Central Ave Apt C, Alameda Telephone (510) 521-2042
Injured's Employer _____ Employer's Address _____ Telephone _____
- Identify witnesses to accident or injury. (Use reverse side to list additional witnesses if necessary.)
Name _____ Address _____ Telephone _____
- Nature and extent of injury to person or damage to property.
Patron (Blind) was injured in fall into trackway #2 @ 10:30
- Briefly describe circumstance of accident / injury or property damage.
Blind patron mistakenly mistook space between cars for open car doors
- Disposition of injured: ☐ Refused aid or assistance ☐ First aid only ☒ First aid and dispatched
- Injured dispatched to: ☐ Doctor (name) _____ ☐ Hospital (name) St. General ☐ Other _____
- Injured released to: Medic 3 By (name) _____
- District Police Officer present? (name) BPS Alvarez & Wilson
- Check conditions at time of accident:
☐ Wet ☐ Damp ☒ Dry ☐ Clear ☐ Foggy ☐ Raining ☐ Poorly Lighted ☒ Well Lighted ☐ Daylight ☐ Dawn
☐ Dusk ☐ Dark ☐ Other _____

ON TRAIN

- Train No. _____ Run No. 451 Consists of cars Nos. 1 2 3 4 5 6 7 8 9 10 Circle Car Involved
- Accident location: ☐ Grade ☐ Subway ☐ Aerial ☐ Tube ☒ Other platform 2 - trackway
- Station name 16th Yard name _____ Track No. _____ Milepost _____
- ☐ Outside car ☐ Between cars and platform ☒ Other in between car #1 & 2
☐ Inside car ☐ At side doors nos. _____ ☐ At end doors ☐ X ☐ Y

PATRON ACTIVITY

- ☒ Boarding ☐ Alighting ☐ Sitting ☐ Standing ☒ Other patron attempted to board
- Estimated number of passengers in car at time of accident _____ Estimated number of passengers on train at time of accident _____
- Did exterior part of car contact injured? ☒ Yes ☐ No If Yes, what part of car? _____
- If train moving at time of accident indicate speed _____ MPH, and distance traveled after the contact: _____ Feet.
- Was train under ☒ Automatic ☐ Road Manual ☐ Yard Manual ☐ Other _____
- Any unusual condition: ☐ Start ☐ Stop ☒ Other (Describe) train was able to pass by patron

ON PROPERTY

- Accident Location (Identify): ☒ Station Name 16th ☐ Other Track 2
- ☐ Parking Lot ☐ Plaza ☐ Free Area ☐ Paid Area ☐ Concourse ☐ Platform Number _____
- Escalator No. _____ ☐ Ascending ☐ Descending Stepping ☐ On ☐ Off
- Elevator No. _____ ☐ Ascending ☐ Descending Stepping ☐ On ☐ Off
- Stairway Number _____ ☐ Ascending ☐ Descending
- Note any unusual or abnormal condition at time of accident: patron walked in between two cars as train in automatic & fell into trackway
- Note any personal observations or opinions regarding this accident or the manner in which it was handled. (Use reverse side if necessary)
Patron was cut, bleeding and bruised but seemed otherwise OK

SIGNATURES

- Submitted by: Stacey Owens Supervisor's Signature _____
Position: S/D Position: _____

DISTRIBUTION: Original — Insurance Dept. Copy To: Safety Dept. Copy To: Department Head

EXHIBIT “B”



PRELIMINARY INCIDENT REPORT

Report Date: 8/19/04

Incident date: 8/19/04

Incident time: 1032

Incident Description: INCIDENT M50-2 BLIND PERSON IN TRACKWAY

Supervisors Name: (Please note that the first call that came thru from Central was a page: "M50-2 Blind person fell in trackway head injury EMT rolled - no trains in area.)

Assisting Supervisor Name: N/A

Time On Scene: N/A

Incident Commander #1; IC #2, IC#3 N/A

Case No. 33213

Departments On Site: BPS - Officers: Alverez and Wilson

Other:

Equipment: 9 car consist

Car No's: (N) 1262-1767-1729-1606 * 439-2503-1663-699-1263 (S)

Damage: N/A

Amount: N/A

Patron(s) Injured - Number: (1) Patricia Nash
901 Central Ave. Apt. C
Alameda CAType Injuries:
Bruises, cuts & light bleeding

Phone: 510-521-2042

Environment: Underground Station

Milepost: N/A

Interlocking: N/A

Time of Incident:

Location of Station: 16th. Street Station

1032

Conditions: Weather/Visibility: Lighting was normal

Track: P2

Personnel Involved:

Employee Name: Philip Johnson

Hire Date: 09-04-02

Work Hours:

Employee I.D. 57812

Extra Board/Hold
Down 0600-1400

Status: OOS PENDING TEST RESULTS & INVESTIGATION

Drug and Alcohol Test: Yes ☒ No ☐

SYNOPSIS

At approximately 1032 a.m. a blind woman, Patricia Nash attempted to board a Richmond bound train (T451) @ 16th. Street Station. According to UOR from Station Agent, Linda Ramirez the patron indicated that she walked in-between two cars and fell into the trackway. She felt for the wall and rolled underneath the lip of the platform until the train passed by. Patrons helped her up onto the platform. Ms. Nash's injuries included bruises, cuts and light bleeding. System Service worker Matt Marvel notified the agent, Linda Ramirez, who picked up the red emergency telephone to notify Central and ask for an ambulance. Ms. Nash was taken by Medic 3 to San Francisco General Hospital. Train Operator Philip Johnson, Daly City Operator (currently on a hold down in Millbrae) did not see the woman when he arrived at the platform or saw anything unusual when he went to the window to monitor the passengers entering and exiting the train. (Normal door cycle). Mr. Johnson stated that when he departed 16th. Street Station, he received an intercom call from a passenger that he heard a blind woman scream - the intercom caller was very vague. As Philip was speaking to the person on the intercom his train entered Civic Center and doors opened, at this point central was calling him to hold "key off". Philip explained to Central about the call. Philip was released from his hold and he continued to Richmond where he took a short break. Philip was removed from service and a "Fact Finding Investigation" was held. Philip was taken to his home (drop off time was 1525 - Central was notified.)

OTHER EMPLOYEES INVOLVED			
Name	Address/Dept.	Phone No.	Employee Y/N
Stacey Owens Linda Ramirez Matt Marvel	Station Agent Station Agent System Service		
Additional Comments and Information:			
Preliminary Conclusion:			
The incident is still under investigation, and the final determination has not yet been established.			

cc:

P. Oversier

"M" Line ACTO/C.Anderson

"M/W" Line Manager/L.Vasquez

Operations Control Center

A.H. Johnson

System Safety /David Sanborn

EXHIBIT “C”

RUN DATE: 02/13/2007
RUN TIME: 11:24

SAV AREA RAPID TRANSIT DISTRICT
MAINTENANCE AND RELIABILITY INFORMATION SYSTEM
CARS 0439 AND 2503 - CONSISTS REPORT
FOR PERIOD 07/01/2004 THROUGH 08/19/2004
ORDERED BY: DATE IN SERVICE, CAR NUMBER, CONSIST NUMBER

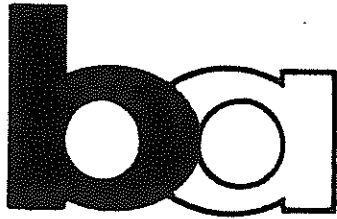
PAGE: 66
REPORT: CONSEL

TIME		DATE INSRV		INSRV		CONSIST	ORDER	CAR
08/18/2004		15:43:00		451-02		8	1699	
						9	1263	
08/19/2004		6:25:00		451-02		1	1262	
						2	1767	
						3	1729	
						4	1608	
						5	0439	
						6	2503	
						7	1863	
						8	1699	
						9	1263	
453-01						1	1262	
						2	1767	
						3	1729	
						4	1606	
						5	0438	

B00027

EXHIBIT “D”

**SAN FRANCISCO BAY AREA RAPID
TRANSIT DISTRICT**



CONTRACT BOOK

**TECHNICAL PROVISIONS
FOR THE PROCUREMENT OF
TRANSIT VEHICLES**

AUGUST 1991

INCLUDES ADDENDUM 1-6 1/92

MODIFICATION No.1 2/92

CONFORMED 5/92

**CONTRACT NO.42DA-110
VOLUME 3**

CONFORMED

A solid black rectangular redaction mark is located in the bottom right corner of the page, partially obscuring the word 'CONFORMED'.

SECTION 3

CAR BODY

3.01 DESCRIPTION

A. This section specifies the requirements for each car body.

B. **Definitions:** Car body includes basic structural shell, including floor framing: roof and wall framing, supports for trucks, supports for equipment, exterior sheathing for roof and walls, floor deck, insulation, interior, windows, carpeting, seats, stanchions, handrails, grab-handles, crew steps, doors, and intercar closures.

C. **Interior Arrangement:** Arrangement of seats, windscreen, stanchions, and handrails in cars shall be as shown on Contract Drawings.

3.02 CITED REFERENCES

A. USGPO - United States Government Printing Office

1. FMVSS 222: Federal Motor Vehicle Safety Standard, as published in Federal Register, Volume 41, Number 19, January 28, 1976.

B. Munsell Color

1. Munsell Neutral Value Scale

C. NEMA - National Electrical Manufacturers Association

1. 250: Enclosures for Electrical Equipment (1000V maximum)

3.03 SUBMITTALS

A. **Mock-Up Requirements:**

1. General:

a. Provide mock-ups that show conformance to maintainability and human factors requirements herein. Approved mock-ups shall be of dimensions, colors, textures, methods of construction, and workmanship as specified in this Contract.

b. **Scheduling Requirements:**

1) **Underfloor Mock-Up:** Mock-ups shall be provided prior to Design Review number 2 and before design of equipment enclosures and selection of enclosure and equipment locations.

2) **Cab and Seat Mock-Ups:** Mock-ups shall be approved by the District prior to actual production and installation of equipment in cars.

c. Mock-ups shall not be required where components and assemblies are installed in the same configuration and are completely interchangeable with same components and assemblies and are physically identical to the components

currently installed on District C-cars purchased under contract 42AA-110.

2. **Cab Mock-Up:**

a. **Number and Scale:** Provide full-scale mock-up of full width cab including passenger area wall.

b. **Mock-Up Requirements:** Provide mock-up showing train operator controls, signs, seat, and comfort equipment.

3. **Underfloor Mock-Up:**

a. **Scale:** Provide full-scale mock-up of underfloor arrangement of car.

b. **Mock-Up Requirements:** Provide mock-up showing location of underfloor mounted equipment, including ducts for air conditioning, raceways, sufficient truck equipment to show appropriate clearances, access, and other design requirements.

4. **Seat Mock-Ups:**

a. **Number and Scale:** Provide one each full-scale mock up of proposed operator and passenger seats.

b. **Mock-Up Requirements:**

1) Provide mock-up showing seats in complete detail.

2) At time of submittal of mock-up, submit samples of materials used in construction of seats.

B. **Samples:**

1. **General:** Submit minimum twelve-by-six-inch samples of interior and exterior finish materials in accordance with quantity and other requirements following for approval of colors and color ranges, textures, and physical properties:

a. **Interior:** Three samples of each different color and texture.

b. **Exterior:** Two samples of each different type material. Samples shall include welds or fasteners if they are used in body shell construction.

C. **Structural Analysis:**

1. Provide analyses as indicated in Section 16, entitled "MANAGEMENT SYSTEMS," herein.

2. **Collision:**

a. Provide analysis of manner of failure under conditions of extreme end loading and minimum loading initiating such failures, including analysis of interlocking of longitudinal members of cars or other means to prevent telescoping and jackknifing of cars. Additionally, include conditions of impact as specified in this Section.

b. Provide discussion of what would happen to car structural features such as seats and handrails.

3. Deflections and Frequencies:

a. Tabulate deflections and natural frequencies of car body under each indicated vertical load condition.

b. Provide calculations showing following:

1) Deflection of car structure under cantilevered seat and floor loads. Additionally, these calculations shall show deflections of side framing and principal transverse members such as cross-bearers, bolsters, and end sills.

2) Longitudinal shortening of car structure between bolsters and between end sills under statically resistant end loads applied at center of end sill, and lateral and vertical deflection of car body structure under this loading.

3) That car body frequencies are not coupled with frequencies of truck and that combination of car body and truck frequencies shall not couple with aerial structural frequency as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

3.04 INTERFACE REQUIREMENTS

A. **General:** Cars provided shall comply with following requirements with respect to the District's existing B-cars and C-cars.

1. Car bodies shall be similar in appearance and provide collision characteristics (acceleration and energy absorption) compatible with existing B-car and C-car types. Refer to Article 3.05, entitled "CONSTRUCTION," Sub-Article 3.05E, entitled "Crashworthiness Criteria," herein.

2. Walkways and intercar closures shall function physically like those of existing B-car and C-car types and as shown on Contract Drawings.

B. Seat Assembly

1. Seat assembly, cushions and frames shall be completely interchangeable with Teperman P/N 129-0541-000-0, -0542-, -0543-, -0544-, -0545-, -0546- seat assemblies, cushions, and frames used on District C-cars purchased under Contract 42AA-110 and as shown on Contract Drawings.

C. **Side Doors** shall be as shown on Contract Drawings.

D. **Closure Requirements:** Closure shall interface and be completely functional and compatible with the District's existing intercar closures.

E. **Anticlimber and Closure Buffer Faceplates:** Anticlimbers and buffer face plates shall be provided on both ends of all cars and shall be completely functional and compatible with the District's existing cars.

F. **Glass:** Glass shall be as shown on Contract Drawings.

3.05 CONSTRUCTION

A. General:

1. Car Body: Each car body shall:

a. Be designed to carry specified loads.

b. Be structurally similar to existing vehicles to form an integrated structure capable of resisting, without permanent set of principal structural members and without other detrimental or destructive deformations, loads and stresses inherent in type of service anticipated.

c. Be constructed and assembled in accordance with general arrangement and dimensions indicated.

d. Be welded, mechanically fastened, or bonded structure, or combination of aforementioned, consisting of longitudinal extruded members, vertical stiffeners and other items similar to existing vehicles.

e. Have sheathing of aluminum.

f. Be watertight, including installed windows and doors.

g. Be designed for minimum fatigue life of 20 years.

2. Car Frame: Each car frame shall:

a. Have framing structure designed to carry normal loads efficiently and to provide cars which shall, under conditions indicated, dissipate energy of impact without leaving trackway or overriding. This shall be accomplished with least possible shock and with maximum plastic deformation at ends. (Refer to Sub-Article 3.05E, entitled "Crashworthiness Criteria," herein.)

b. Be constructed of aluminum or other materials as deemed necessary by the Supplier to provide compliance with operational requirements of Section 2, entitled "SYSTEM REQUIREMENTS" herein.

3. **End Underframe Units:** Units consisting of body bolster, draft sill, and end sill shall be fabricated of aluminum or low-alloy high-tensile steel and contain adequate drain holes in cavities.

B. **Vertical Loading:** Vertical load of AW3, with live load uniformly applied to seat frames and standing area of floor deck, shall not cause stress level in any structural member to exceed 50 percent of yield stress for material used.

C. Camber:

1. Car bodies may be built with positive camber.

2. Under any design approach, car structures and car-mounted equipment shall not violate clearance envelopes.

D. Compression Loading (Buff Loading):

1. Static compressive end load equal to three times AW0 acting along vehicle body longitudinal centerline and distributed about center one-third of end sill shall not cause any permanent deformation of any part of car body structure when combined with vertical load of AW3 minus AW0.

2. Cantilevered seat loads shall be applied to side walls, with remainder of vertical load applied uniformly over standee area of car floor.

Car Body

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3. Combined stresses due to loading conditions specified in Article 3.06, entitled "UNDERFRAME," Sub-Article 3.06D, entitled "Truck Connection to Car Body," shall not exceed 90 percent of yield value of structural materials.

4. Vehicle body shall be tested for combined load condition in Sub-Articles 3.05D.1 and 3.05D.2 above and tested or analytically checked for condition specified in Sub-Article 3.05D.3 above.

E. Crashworthiness Criteria:

1. Cars shall have capability to dissipate energy of impact without leaving track or overriding on tangent track.

2. Cars shall be structurally designed to be compatible with the acceleration, deflection, and energy absorbing characteristics of the District's existing cars. Figures 3-1 through 3-6, represent two-car consist and four-car consist impacting same size consist standing still. Additionally, to be compatible with existing cars, transfer of energy has to take place through antilclimber and end sills.

NOTICE

The survivability of the BART vehicle is based on controlled progressive failure with the maximum energy absorbed in bending and crushing the ends of the colliding cars up to the bulkhead separating the attendant's area from the passenger area. Additional energy is absorbed in the collapsing of the couplers and deformation of the ends of following cars before serious damage to the passenger area of the lead car is acceptable.

3. Crashworthiness Analysis:

a. Provide analyses using consists with only C-type cars in accordance with following requirements:

1) To determine expected extent of any damages, provide analysis (assume that couplers on colliding cars do not mate) showing results of:

a) Four-car consist traveling at 40 miles per hour striking standing (brakes locked) four-car consist with each car at AW1.

b) Two-car consist traveling at 40 miles per hour striking standing (brakes locked) two-car consist with each car at AW0.

2) To determine expected extent of any damages while operating in yard at AW0, provide analysis showing result of cars traveling at 10 miles per hour and impacting with couplers mating and not mating:

a) Cab end into cab (brakes locked).

b) Cab end into non-cab end (brakes locked).

c) Non-cab end into non-cab end (brakes locked).

F. Hoisting and Jacking**1. Hoisting:**

a. Provide four hoisting connections at symmetrical locations at the edge of roof as shown on Contract Drawings.

b. Provide means to attach removable hoisting lugs. Sockets shall have renewable threads. Socket Threads shall be 1-1/2 - 6 UNRC - 2A.

c. Any holes provided shall have means to prevent collection of moisture and be provided with drain holes, plugs, or some other suitable arrangement. Any removed parts will be attached to car with suitable tether.

d. Provide hoisting points which, when used together as group, shall make it possible to lift empty car weight, including trucks, at design level of 50 percent of yield.

2. Jacking:

a. Eight jacking pads shall be provided, one at each corner and one near each bolster inboard of truck attach points on both sides of cars as shown on Contract Drawings.

b. Each jacking pad shall be capable of supporting one half of weight of complete car and capable of restraining force in horizontal plane equivalent to 1/8 of weight of complete car without permanently deforming or damaging car body.

c. Pads shall have an alignment hole in center of pad and have three sided guard to provide anti-slip feature and be readily accessible for use by removing only the adjacent skirt section but no other car element.

d. Vehicle body shall be capable of resisting torsional and bending loads caused by any jacking condition, including diagonal jacking at two of most adversely opposing jacking pads, without suffering any permanent deformation or damage.

3.06 UNDERFRAME**A. General:**

1. Underframe shall consist of structural assembly on which floor is mounted and to which sides, ends, trucks, and couplers are attached.

2. Underframe shall be designed to function integrally with other car body elements in resisting design loads.

3. Underframe structure shall be painted an approved gray Munsell Neutral Value Scale N6/30.0 %R in accordance with the requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein with a durable gloss paint approved by Project Director.

B. End Underframe:**1. General:**

a. End underframe shall consist of end sill, draft sill, and body bolster.

b. Assembly shall act as an integral unit to transfer loads generated at antilclimber, coupler, and truck interfaces.

c. Design shall provide for load path continuity at joints.

2. End Sill:

a. End sill structure shall be mating structure between anticlimber feature and draft sill for transfer of collision loads.

b. Together with end frame structure, end sill structure shall be capable of carrying, without permanent deformation, minimum 40,000-pound vertical load acting upward or downward, as well as specified buff loads.

3. Draft Sill:

a. Draft sill structure shall be designed to react to buff and draft loads induced by coupler-draft gear unit as specified in Section 4, entitled "COUPLER AND DRAFT GEAR," herein, in addition to any vertical loads induced by anticlimber feature.

b. No damage or permanent deformation shall result from any loading up to load which activates emergency release feature specified in Section 4, entitled "COUPLER AND DRAFT GEAR," herein.

4. Body Bolster:

a. Body bolster shall be structure capable of transferring loads passing between trucks and car body, and shall function integrally with other body elements in resisting design loads.

C. Anticlimber:

1. Anticlimber shall be mechanically fastened to end sills at X and Y-ends of cars as shown on Contract Drawings.

2. Under collision conditions each anticlimber shall mate with opposing anticlimber to prevent one car from climbing over other car. Additionally, no structural deformation or slippage shall occur under vertical load of 40,000 pounds minimum acting upward or downward, combined with longitudinal compression load three times AW0. Structure design shall allow end sill yield prior to failure of the anticlimber or attachment.

3. Anticlimbers shall be constructed of same material as car body or end underframe.

4. Anticlimber shall interface and prevent climbing under conditions as specified herein while mating and comply with applicable requirements of Article 3.04, entitled "INTERFACE REQUIREMENTS," herein.

D. Truck Connection to Car Body:

1. Connection between car body and trucks shall be such that trucks shall be raised with car body, unless intentionally detached.

2. Connection shall provide adequate strength to resist shock loads as specified for car mounted equipment.

3. Connection shall meet the requirements specified in Section 11, entitled "TRUCKS AND SUSPENSION," Article 11.07, entitled "STRENGTH REQUIREMENTS," herein.

4. Provide electrical isolation to meet requirements of Article 9.18, entitled "BONDING AND GROUNDING," herein.

5. Positive stops shall be provided to limit vertical and transverse movement of trucks.

6. Shall interface with trucks from existing cars to allow fleet interchangeability of trucks.

E. Underfloor:

1. Underfloor shall consist of cross members and floor deck cross bearers (lateral beams) or longitudinal extrusions, which tie securely to side members to form basic framing for support of floor deck and underfloor equipment units.

2. Supplementary beams and intercostals shall be used as required for equipment supports and floor deflection requirements.

3. Primary loads on the underfloor shall be the vertical loads created by passenger, floor, and interior item weights, together with specific underfloor equipment loads.

4. Underfloor at ends of car shall be designed for crash worthiness requirements.

5. Vertical, lateral, and longitudinal acceleration load conditions shall not exceed those specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

3.07 BODY SHELL

A. General:

1. Body shell shall include sides, roof, and end assemblies mounted to underfloor and frame.

2. Visible surfaces shall have similar finishes and surface texture to match that of existing District A, B & C-cars.

a. Mechanical finish on aluminum parts shall be per Aluminum Association #45, M33 Course Satin finish.

3. Side and roof surfaces shall not be damaged when passing through high-velocity jet-type or rotary-brush-type automatic car washer.

B. Sides:

1. General:

a. Body shall consist of external sheathing, vertical framing members, and longitudinal members.

b. Side construction shall utilize extruded panel sections and members.

c. Sidewalls shall provide adequate space (area) for air distribution ducts as determined by the Supplier.

2. Loads: Side structure shall be designed to withstand loadings induced by vertical bending effects, vehicle body compression, vehicle jacking, and cantilever-seat effects.

Car Body

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3. Reinforcement: Deflections shall be limited to prevent door movement from being restricted and window glazing from coming loose, being damaged, or leaking under environmental and loading conditions as specified in these specifications.

4. Flatness:

a. Side material and manufacturing method shall ensure uniform flatness along vehicle.

b. Car side longitudinal waviness shall not exceed plus or minus 1/600 of the span between adjacent vertical members. More than one node between adjacent vertical members shall not be allowed.

c. If sidewalls are welded surface welds shall be hidden by sidewall features. Sidewall to vertical post welds shall be designed far enough away from surface to prevent dimpling.

d. Side wall waviness caused by welding shall be precluded by design or completely eliminated after fabrication.

C. Roof:

1. Car roof framing shall consist of carlines with appropriate longitudinal members, all suitably fastened to obtain an integrated structure of adequate strength and rigidity.

2. Roof framing members shall be designed and positioned to permit fastening of roof wiring, lighting fixtures, handholds, stanchions, and speakers for public address.

3. Roof structure shall be capable of withstanding without damages load generated by 300-pound person walking on roof.

4. Rain gutters shall be installed on roof in such manner as to preclude water draining over passenger side doors, cab windows, end doors or flipper doors. Additionally, aforementioned requirement shall also apply when train is accelerating or decelerating.

5. Rain gutters shall drain completely when car is standing on level track.

a. Rain gutters at Y-end shall stop at cab on C-car and provisions for draining shall be provided for by drain tubes with screens to prevent clogging to undercar.

b. Rain gutters on C-car X-end and B-car X & Y-end shall extend 3/4" past end wall to preclude water draining down end walls.

D. Ends: Car ends shall be designed to transfer loads specified and shall comply with exterior and interior conformance as shown on Contract Drawings.

3.08 INSULATION

A. Provide thermal insulation integrated with car structure complying with overall thermal requirements as specified in Section 7, entitled "HEATING, VENTILATING, AND AIR CONDITIONING," herein.

B. Provide acoustical insulation applied where necessary to comply with noise and vibration requirements of Section 2, entitled "SYSTEM REQUIREMENTS," herein.

C. Provide materials complying with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

D. Secure rigid and nonrigid preformed insulation with mechanical fasteners or fire-resistive adhesives, or both.

3.09 FLOORS

A. General:

1. Floors shall include deck on which interior covering is laid and longitudinal extrusions which are attached to underframe structure.

2. Floors shall be designed such that no permanent deformation shall occur during life of each car.

B. Floor Deck:

1. Floor decks shall be:

a. Designed to withstand dead load plus passenger load of 80 pounds per square foot.

b. Designed such that vertical deflection shall be limited to 1/360 of short span.

c. Made up of panels of size that can be interchangeable with floor panels used on District C-cars purchased under Contract 42AA-110.

d. Comply with fire resistive requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

2. Deck panels shall be fastened to longitudinal extrusions to prevent squeaking, chafing, and horizontal and vertical movement between adjacent surfaces.

3. Assembled floor deck shall be level and flat except for design camber, with upper surface free from indentations.

4. Exposed edges of floor, including openings for ducts, conduits, and joints between floor sections, shall be sealed.

5. Openings in floor shall be minimized. Any holes shall be fitted with protective covers or another fire barrier system capable of providing resistance to penetration of fire at least equal to basic floor.

6. Washing solutions used in carpet cleaning shall not enter at joints of floor or at wall bases.

3.10 C-CAR OPERATING CAB

A. General: C-cars shall have an operating cab at Y-end, with train operator's console located as shown on Contract Drawings.

B. Configuration:

1. Cabs shall be full width of car.

2. When in mid-train position, cab door shall close off console area to passengers and remainder of cab area shall be available to standing passengers.

3. Equipment located in areas where window and door opening expose equipment to external elements shall be protected.

C. Equipment:

1. Cab equipment shall be as indicated and as approved on cab mock-up.

3.11 UNDERFLOOR

A. General:

1. Underfloor equipment shall be arranged as approved on underfloor mock-up.

2. Equipment requiring inspection shall conform with maintainability requirements of Section 15, entitled "SYSTEM SUPPORT," herein.

3. Underfloor equipment and structure shall be painted an approved gray Munsell Neutral Value Scale N/630.02R color in accordance with the requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein with a durable glass paint approved by Project Director.

4. Where grounding straps are required, connection shall be made of compatible materials.

B. Design:

1. Mounting Requirements:

a. Equipment supported on resilient mounts shall be designed to achieve positive retention above clearance line in event of failure of resilient elements.

b. Underfloor Bolts in Tension may be utilized with approval of the Project Director.

c. Mounting bolts shall have self-locking nuts and secondary retention device on bolts.

d. Failure of any single mount shall not allow equipment to drop below clearance envelope.

e. Design shall be, at a minimum, for the following loads:

- 1) Vertical load, 3G
- 2) Longitudinal load 5G, plus vertical load 1G
- 3) Transversal load 3G, plus vertical load 1G

C. Enclosures:

1. Enclosures shall be designed such that assemblage of equipment and enclosure is waterproof.

2. Boxes shall be designed to protect equipment from under floor environmental conditions.

3. Interior of each box, except battery box, shall be painted white in accordance with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

4. Hardware used to secure doors and access covers on under floor boxes and enclosures shall comply with material requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," and environmental requirements of Section 2, entitled "SYSTEM REQUIREMENTS," herein and shall include secondary retention or failsafe design.

a. All cover securement hardware, except battery box, shall be identical and interchangeable.

5. Covers:

a. Covers on underfloor boxes shall be interchangeable between like boxes on different cars and, to extent possible, between boxes on same car.

b. Battery box covers may be fiberglass, provided they comply with fire-resistive requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

c. Removable covers shall have two-inch-wide reflective tape on both sides visible in headlights and be provided with permanent car numbers on exterior.

6. Battery Box shall be steel or fire resistive fiberglass complying with the requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein, shall be oversize with universal hold down brackets to accommodate batteries of various manufacturers and shall be arranged that each cell is accessible for inspection and watering from side or under car. Additionally, box shall have adequate ventilation and drainage.

D. ~~Raceways:~~ Provide covered raceways complying with material requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

3.12 INTERIOR

A. Floor Covering:

1. Wool carpeting and foam underlayment pads shall be installed to cover floor areas of passenger sections and train operator area.

2. Metal trim strip for carpet shall be installed in such a manner that carpet removal can be accomplished without removing thresholds.

3. Carpet surface shall be smooth and level at junction with thresholds.

4. Carpet in passenger area shall be one piece. A single transverse seam is permissible provided seam is not visible and is constructed in accordance with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

5. Carpeting and underlayment pad material shall be as specified in Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

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B. Interior Liners:

1. Interior liners shall comply with materials and fire-resistance requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.
2. Interior liners shall be designed to eliminate unnecessary joints and to accommodate dimensional changes due to fluctuations in environmental conditions. Interior liners must be removable from completed car.
3. Attachments to structure shall be made by concealed fasteners in manner that discourages vandalism or tampering, but allows easy removal of linings for maintenance procedures.
4. Installed interior liners shall be designed to withstand the deflections and impact loads specified in HP LaserJet II DHPLAID.PRSIure to which they are attached or with which they come in contact.
6. Finish and surface of liners shall facilitate the removal of graffiti. Appearance of interior liners shall be of uniform quality throughout.
7. Lining materials shall be supported sufficiently to prevent sagging and drumming.
8. Lining contours shall be as shown on Contract Drawings.

C. Interior Fasteners:

1. Interior fasteners shall comply with tamperproof requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

D. Door Pockets:

1. Door pockets adjacent to each side door location shall match side lining in appearance.
2. Access doors shall be provided in door pockets and shall have hinges and locking arrangement that operate using standard car key. The number of locks per door shall be kept to a minimum.

E. Windscreens: Windscreens shall be located, as indicated, between side door opening and adjacent seat.

F. Partitions: Partitions between cab areas and passenger seating areas shall have same appearance as wall and ceiling liners and be located as shown on Contract Drawings.

G. Thresholds:

1. Door thresholds shall have anti-slip pattern machined or extruded into surface and incorporate guides for sliding doors where applicable.
2. Threshold plates shall have weathertight connections at floor and door casing and shall drain to outside.

H. Equipment Lockers:

1. Electrical and electronic control equipment shall be located in cab areas, Y-end and X-end walls of cars as shown on Contract Drawings.
2. Control Equipment:
 - a. Control equipment not located in secured cab area shall be located behind panels secured with key locks operable with standard car key.
 - b. Locations of control equipment shall be as shown on Contract Drawings.
3. Equipment lockers shall be provided with air vents as required.
4. Equipment lockers shall provide equipment protection in accordance with NEMA 250 Type 2 enclosure.

I. Deflection and Impact Loads:

1. Interior linings, windscreens, and partitions shall be designed to following deflection and impact load conditions and be integrated with supporting structure such that integrity of supporting structure is retained under these loads when tested in both directions:
 - a. Static Loading: Centrally applied static load of 30 pounds applied on maximum area of four square inches shall not deflect panels more than 1/360 of short span between carbody structural supports.
 - b. Uniform Pressure: Uniform pressure of 15 pounds per square foot shall not deflect panels more than 1/360 of short span between carbody structural supports.
 - c. Impact Loads: Panels shall be designed to resist centrally applied impact load of five foot-pounds applied on maximum contact area of four square inches, incurring deflection no greater than 1/180 of short span between carbody structural supports, without permanent deformation or cracking.

J. Access Doors: Access doors shall be flush-mounted type.

3.13 WINDOWS**A. General:**

1. Safety glass shall be as specified in Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.
2. Windows shall not leak water.
3. Windows shall be single-glazed.
4. Windows shall be installed with tempered side toward inside of car.
5. Window sizes shall be as shown on Contract Drawings.

B. Car Side and Side Door Windows:

1. Windows shall be integral units, fixed type, with elastomeric glazing beads, sizes and shapes as shown on Contract Drawings.

2. Glass shall be Group II.

C. Cab Side Windows:

1. Windows shall have drop sash, which shall be held securely in closed positions by means of latch. Additionally, sash shall be counter balanced with maximum force required to start the cab window moving at any point of fifteen pounds and the maximum force to cause the window to travel through the mid point, up or down, of ten pounds.

2. Window opposite console shall have standard key lock for locking in closed position from inside the cab.

3. Windows shall be weatherstripped and reinforced.

4. Windows shall be fitted with mutes to prevent rattling.

5. Glass shall be set in elastomeric glazing beads.

6. Glass shall be Group II.

7. Window design shall ensure compliance with life test requirements of Section 17, entitled "TESTING", herein.

D. End Door Windows:

1. Each end door shall have window installed as shown on Contract Drawings.

2. Glazing shall be Group III.

E. Cab Door and Partition Windows:

1. Windows in cab door and partition shall be located in upper half of each structure.

2. Glass in cab partition and cab door shall be supported directly in elastomeric glazing strips.

3. Glass shall be Group III.

F. Windshields:

1. Glass shall be set in opening such that it cannot be forced into car.

2. It shall be retained in elastomeric glazing section and be replaceable from outside of car without need for sealing compounds.

3. Glass shall be Group I.

G. Pressure Loading:

1. Windows as installed shall be designed for air pressures acting perpendicularly to window surface in both positive and negative direction as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein with minimum safety factor of 2.5 against failure.

2. Deflections shall be limited to length/180 of short span.

3.14 SEATS**A. General:**

1. Seating arrangement and configuration shall be as shown on Contract Drawings.

2. Seats shall comply with applicable requirements of Article 3.04, entitled "INTERFACE REQUIREMENTS," herein.

3. Materials shall comply with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

4. Seat design shall ensure compliance with life test requirements of Section 17, entitled "TESTING," herein.

B. Passenger Seats:

1. Structure: Attachment of seats shall be to side wall and shall not create dirt-holding pockets and supporting structure shall not be visible.

2. Grab Handle and Crash Pad:

a. Grab handle and crash pad shall be energy absorbing.

b. Crash pads shall be provided for upper rear side of seat back.

c. Crash pad shall be designed for Head Injury Criteria number expressed in FMVSS 222 less than 1,000 at impact velocity of 22 feet per second.

d. Crash pad material shall comply with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

3. Cushions:

a. General:

1) Foam padding and cover material of seat bottom and back cushions shall comply with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

2) Corresponding cushions shall be completely interchangeable, and as shown on Contract Drawings.

3) Seat and back cushions shall consist of padding material and removable covers.

4) Seat cushions shall be supported by serpentine springs.

5) Back cushions shall be supported by rigid inner panels.

4. Longitudinal seats do not require grab handle.

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5. Loads:

a. Passenger seat structure, including car body support structure and attachments to vehicle structure, shall be designed to resist loads listed in following Sub-Article without permanent deformation.

b. Seats or seat components shall not separate from car wall section at any attachment point with following individual loads applied:

1) Distributed load of 495 pounds per passenger applied horizontally along and normal to upper edge of seat back in either direction.

2) Vertical load of 250 pounds applied downward on top edge of seat back at mid-span of dual seat.

3) Vertical load of 500 pounds per passenger applied in center of each seat bottom.

4) Vertical load of 500 pounds per passenger applied at center of front edge of each seat.

5) Handhold load of 330 pounds applied in any direction.

c. Two padded armrests shall be provided for each combination seat assembly.

C. Train Operator's Seat: Seat shall:

1. Be located directly behind console.

2. Be capable of 4.5 inches longitudinal and 8.5 inches of traverse travel with positive position stops.

3. Be capable of vertical, adjustment of between 18.5 and 23.7 inches above top of floor with positive position stops. Additionally, assembly shall contain spring-loaded mechanism to assist seat height adjustment.

4. Be capable of swiveling at least 90 degrees from forward to either side. The back of the seat shall have the corners rounded and/or tapered to allow the seat to swivel in the fully rearward position without hitting the head end relay panel doors. There must be positive stops to prevent the seat from hitting the console when it swivels.

5. Have structure, support, attachments, and adjustment locking mechanisms capable of withstanding, without permanent deformation or disengagement, in all positions, vertical uniformly distributed load of 330 pounds applied at forward edge of seat and horizontal uniformly distributed load of 500 pounds applied normal to upper edge of seat back.

6. Be constructed of seat materials complying with same fire-resistive requirements as passenger seats.

7. Shall be completely interchangeable with Alstom P/N 0346931000 Train Operators seat used on District C-cars purchased under contract 42AA-110.

D. Retractable Folding Seat:

1. Folding seat shall be as shown on Contract Drawings.

2. Seat dimensions shall be as follows:

a. Folded 8.75" from wall maximum

b. Open 44" wide x 18.5" deep

3. Design and color shall be similar to other seats.

4. Seat shall return to folded position when not in use.

5. Height of seat shall be 18" above top of floor.

6. Vertical load requirement shall be as specified in Article 3.14B5 as applicable.

3.15 HANDRAILS, GRAB HANDLES, AND CREW STEPS**A. Handrails:**

1. Handrails shall be as indicated and allow overhead clearance of 76 inches minimum.

2. Handrail fittings shall be aluminum, of similar construction, shall provide tight and rattleproof fastening, and shall be free of burrs and sharp edges.

3. Each handrail shall be stainless steel tubing and shall withstand, without permanent deformation, distributed load of 10 pounds per inch applied at any angle within 45 degrees from vertical downward.

4. Handrails through doorway area must be padded with a material similar to the texture and cushion of the grab handle. This padding will be orange in color.

5. Padding material shall with requirements of Section 19, entitled "MATERIAL AND WORKMANSHIP", herein.

6. Shall be completely interchangeable with Alstom P/N 0339646000 Handrails used on District C-cars purchased under contract 42AA-110.

B. Crew Grab Handles and Steps

1. Crew grab handles and steps shall be provided at side of each car, as shown on Contract Drawings.

2. Each grab handle shall be stainless steel and shall withstand, without permanent deformation, concentrated load of 330 pounds applied at its midpoint acting in any direction.

a. Grab handle shall be completely interchangeable with Alstom Part #TRR340654, Grab handle used on District C-car purchased under contract 42AA-110.

3. Steps shall be designed with safety factor of 1.5 against yield, to withstand loads imposed by 300-pound person and shall be as shown on Contract Drawings.

3.16 DOORS

A. General: Cars shall have four types of doors: side doors, end doors, cab doors, and flipper doors, which shall be as shown on Contract Drawings.

B. Side Doors:**1. General:**

a. Each side doorway shall contain sliding doors of the bi-parting type, opening from center, and retracting into pockets in car side wall.

b. Doors shall be as shown on Contract Drawings.

c. There shall be window in top half of each door leaf as shown on Contract Drawings.

2. Construction:

a. Doors shall be adequately reinforced internally to provide strength and rigidity. Additionally, appropriate drain holes shall be provided at bottom to prevent entrapment and allow drainage of moisture.

b. Joints and Edges:

1) Joints and edges shall be sealed.

2) Door edge shall be tongue-and-grooved as indicated and be black resilient material conforming to material and performance requirements of Sections 19, entitled "MATERIALS AND WORKMANSHIP," and 6, "DOOR OPERATION AND CONTROL," herein.

c. Door panels shall be aluminum with interior and exterior finish same as used on transit vehicle exterior.

d. Side doors and mounting hardware shall be constructed to provide proper strength and rigidity to sustain, with maximum deflection of 0.5 inch, force of 200 pounds applied from inside on an area of 24 inches by 12 inches, with long axis parallel to that of door two inches from door edge and centered within height of door.

e. Doors shall be weatherstripped for sealing as required to comply with climatic and noise environments as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein. Additionally, drain pan shall be installed in door pocket areas to drain water clear of underfloor apparatus.

f. Doors and mounting hardware shall:

1) Withstand external air loads and negative air pressure as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

2) Operate and withstand temperature differential across doors for winter and summer conditions as specified in Section 2, entitled "SYSTEM REQUIREMENTS," and air environments as specified in Section 7, entitled "HEATING, VENTILATING, AND AIR CONDITIONING," herein.

3. Installation and Operation:

a. Each door leaf shall be hung at top from low-friction track and ball arrangement, with guide at bottom to restrict lateral movement.

b. Convenient access to door adjustments shall be provided.

c. It shall be possible to remove and replace door leaf without removing windcreens.

d. Doors shall not rattle or vibrate in closed position.

C. End Doors:**1. General:**

a. Doors shall be designed to be manually opened but shall have mechanism that shall cause doors to close when released. Additionally, mechanism shall include adjustable decelerating device to ensure safe closing operation.

b. Each end door shall have window in top half as shown on Contract Drawings.

2. C-car Y-end doors shall:

a. Be single-leaf type, retracting fully into pocket in end wall, as shown on Contract Drawings.

b. Be hung at top from low-friction track and ball arrangement with appropriate guides at bottom to restrict fore and aft movement.

c. Be designed to exclude weather elements experienced during layup with flipper doors open.

d. Have construction same as side doors.

e. Be designed for air loads as specified in Section 2, entitled "SYSTEM REQUIREMENTS," with flipper doors open on door surface area, including window, with minimum safety factor of 2.0 against yield.

3. B-car Y-end and X-end doors and C-car X-end doors shall:

a. Be bi-parting leaf type, opening from center and retracting into pockets in car end walls as shown on Contract Drawings.

b. Have support and construction details same as those for side doors.

c. Be designed to withstand air loads on door surface area including window with minimum safety factor of 2.0 against yield.

d. Be defined to exclude weather conditions as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

D. C-car Cab doors shall:

1. Be swinging door that shall close off whole cab end to passengers or train operator's console location only.

2. Have window in top half.

3. Latch and lock in closed positions.

4. Utilize standard car key for access from outside cab.

5. Provide cab curtain latches as shown on Contract Drawings. Latch style shall be Carr Fastener Company, Part No. 78322, or equal.

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E. C-car Flipper Doors:

1. Flipper doors shall be provided as shown on Contract Drawings.
2. Opening and closing of doors shall be manual and be positively retained in both open and closed positions. Manual operation of door shall be accomplished using one hand.
3. Doors shall be:
 - a. Designed to withstand wind loads and pressure differential specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein for both open and closed positions.
 - b. Operable from both outside and inside car using standard car key.
 - c. Able to withstand loads caused by interfacing with existing car and C-car closures.

F. Door Attachment and Restraining Hardware:

1. Side Doors and End Doors:
 - a. Door Hangers: Sliding door panels shall be supported by at least two hangers at top of door. Continuous hanger is considered to meet this requirement.
2. Cab Doors:
 - a. Cab doors shall be hinged and provided with latch on door to secure door into the two closed positions as shown on Contract Drawings.
 - b. Doors shall be set to swing through 180 degrees from train operator's area side wall into passenger area.
 - c. Stops shall be provided to prevent damage to door or other structure.
 - d. Door latch shall positively stop door at 90 degree position when being operated in either direction.
3. Access:
 - a. Easy access shall be provided to door hardware for removal, installation, repairs, and maintenance.

3.17 INTERCAR CLOSURE**A. General:**

1. Both ends of each car shall have intercar closures to provide safe passage between cars as shown on Contract Drawings.
2. Closure assembly shall be designed to operate safely under environmental conditions as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.
3. Closure shall comply with requirements of Article 3.04, entitled "INTERFACE REQUIREMENTS," herein.

B. Description: Design shall:

1. Be as indicated and include buffer faceplate suspension seal.
2. Eliminate metallic contact at interface between cars and metallic connection between this interface and car bodies. Sliding contact shall be prevented except at surface of closures.

C. Construction Details:

1. Each car end closure section shall consist of buffer faceplates extended from car end sill by elastomeric shear springs capable of angular and longitudinal motion.
2. Footplate hinged from end sill shall bridge gap to buffer faceplate top flange.
3. In uncoupled position, end-closure assembly shall support live load of 300 pounds with out excessive deflection.
4. Above buffer faceplate and seal, diaphragm of resilient or extruded elastomeric tubes, having sufficient elasticity and capable of providing enclosure between cars in conditions resulting from coupled mainline service on the District's property shall be provided. Additionally, diaphragm on one car shall directly contact that on adjacent car without use of diaphragm faceplates.

D. Faceplate Springs: Buffer faceplate springs shall provide minimum 700 pounds of pressure in coupled position, which shall be deflected one inch from free position.

E. Loads: Intercar closure shall be designed to withstand wind loads as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

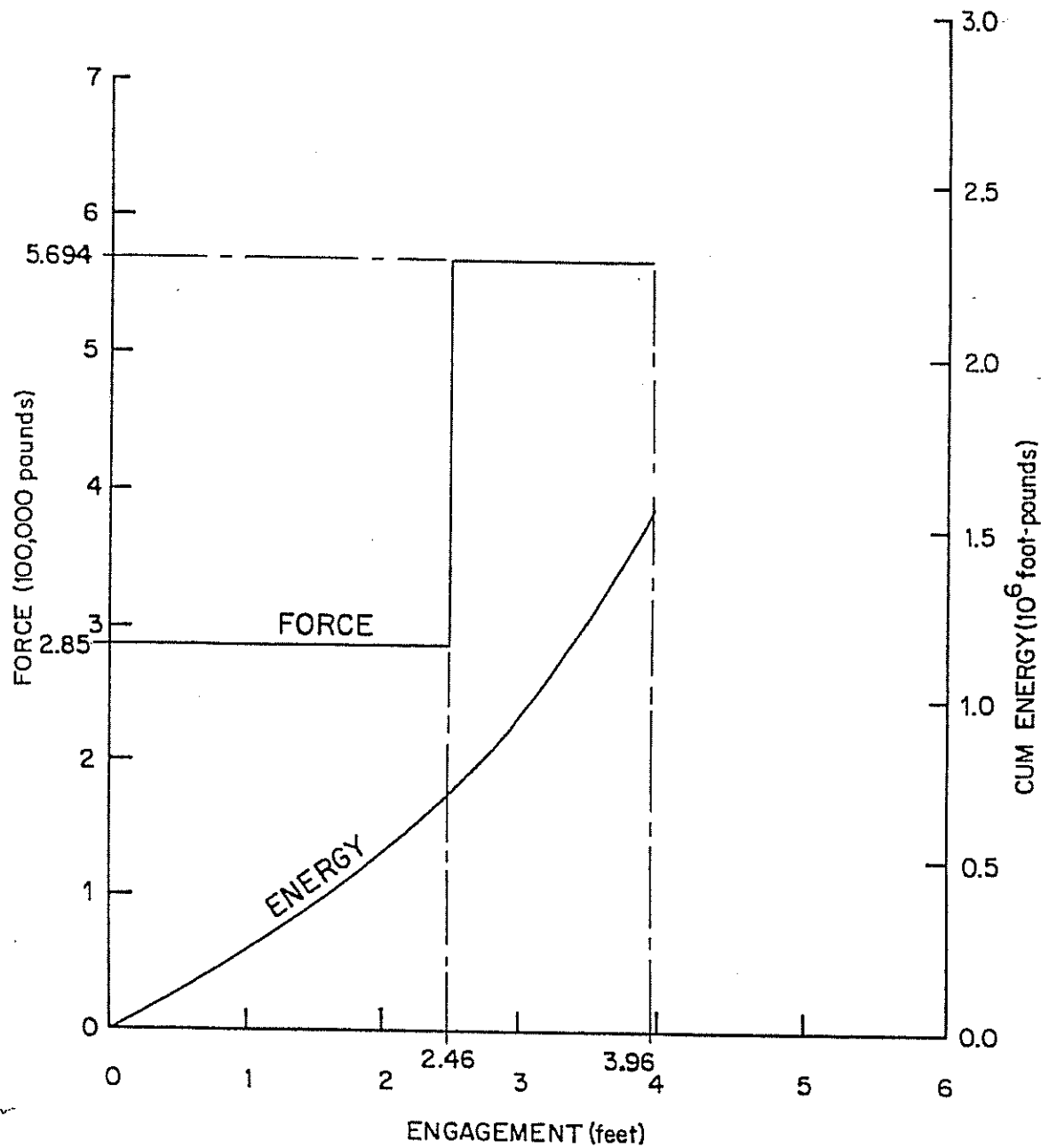


FIGURE 3-1 - CRUSHING FORCES & ENERGY
2-CAR TRAIN COLLIDING WITH IDENTICAL TRAIN AT AWO

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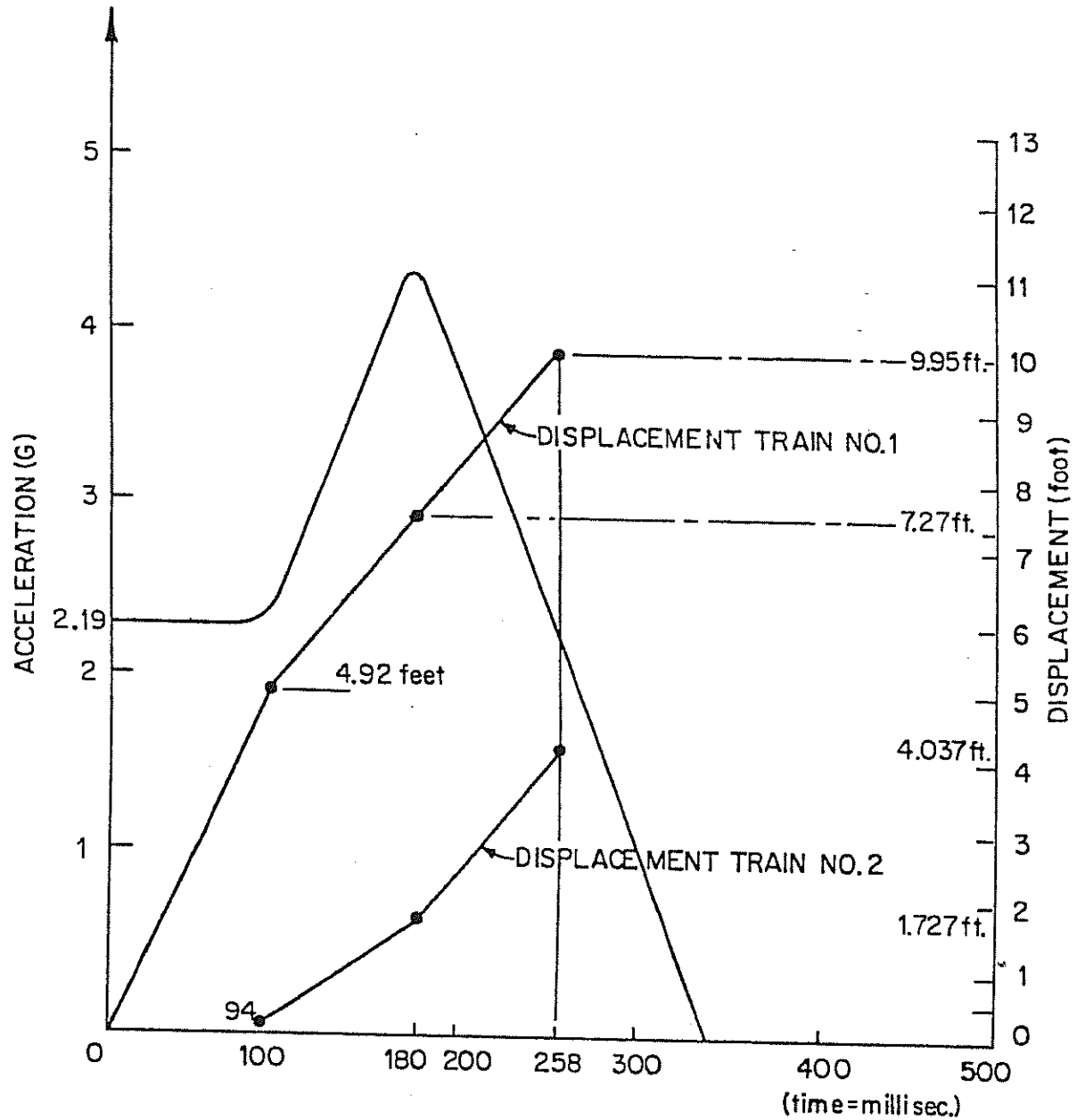


FIGURE 3-2 - ACCELERATION & DISPLACEMENT FOR EACH 2-CAR TRAIN COLLIDING WITH IDENTICAL TRAIN AT AWO

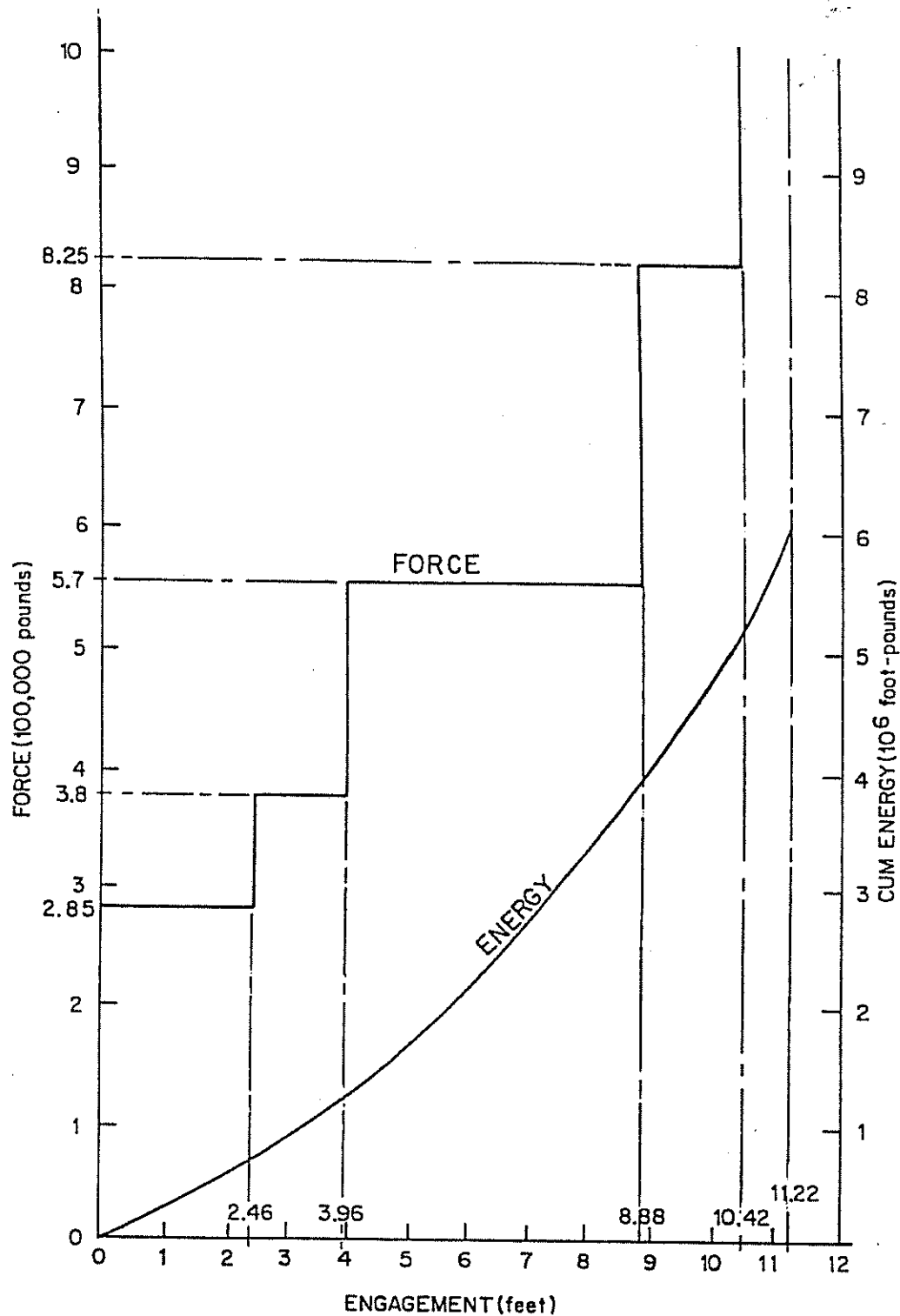


FIGURE 3-3 - CRUSHING FORCES & ENERGY
4-CAR TRAIN COLLIDING WITH IDENTICAL TRAIN AT AW1

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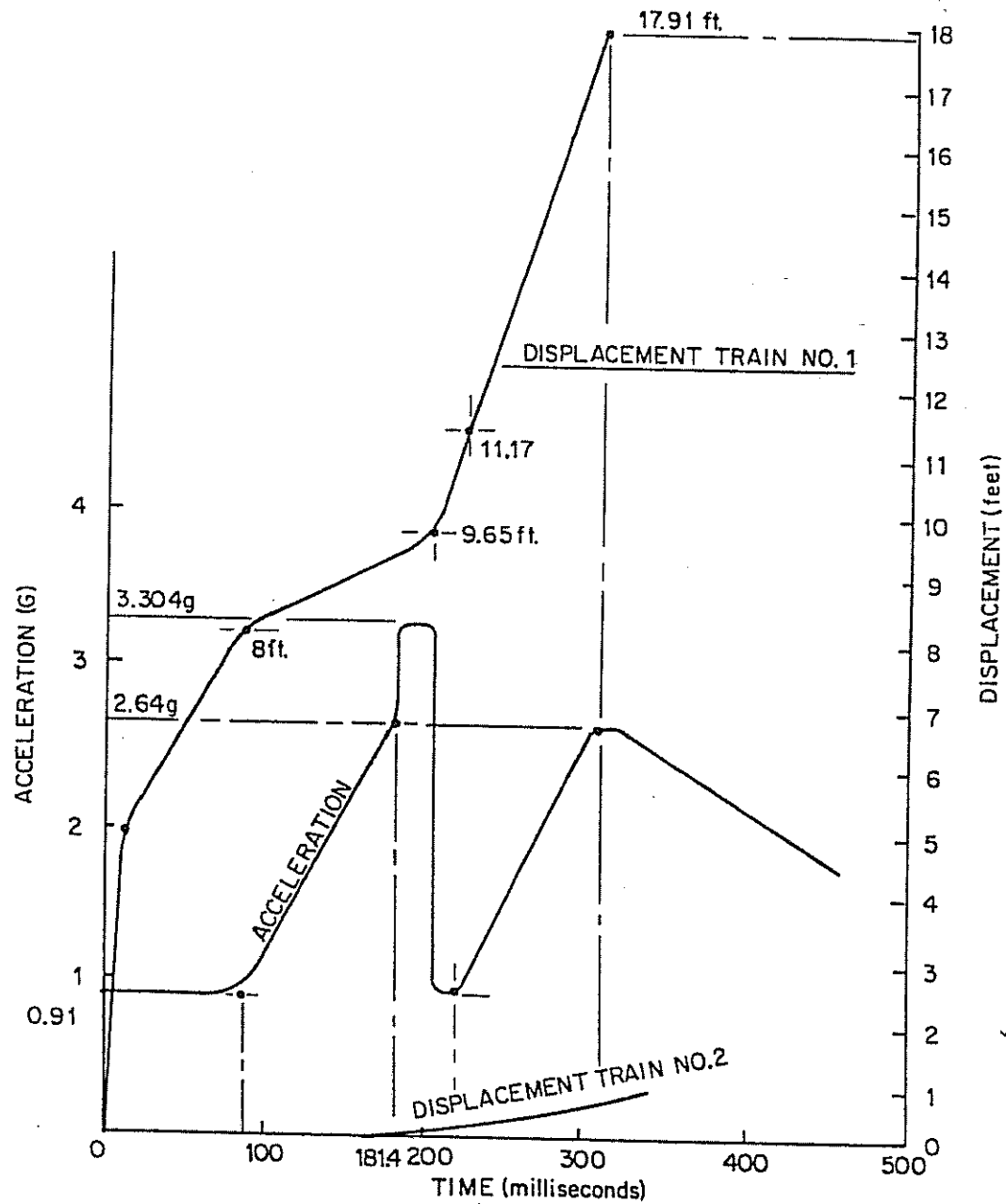


FIGURE 3-4 - ACCELERATION & DISPLACEMENT FOR EACH 4-CAR TRAIN COLLIDING WITH IDENTICAL TRAIN AT AW1

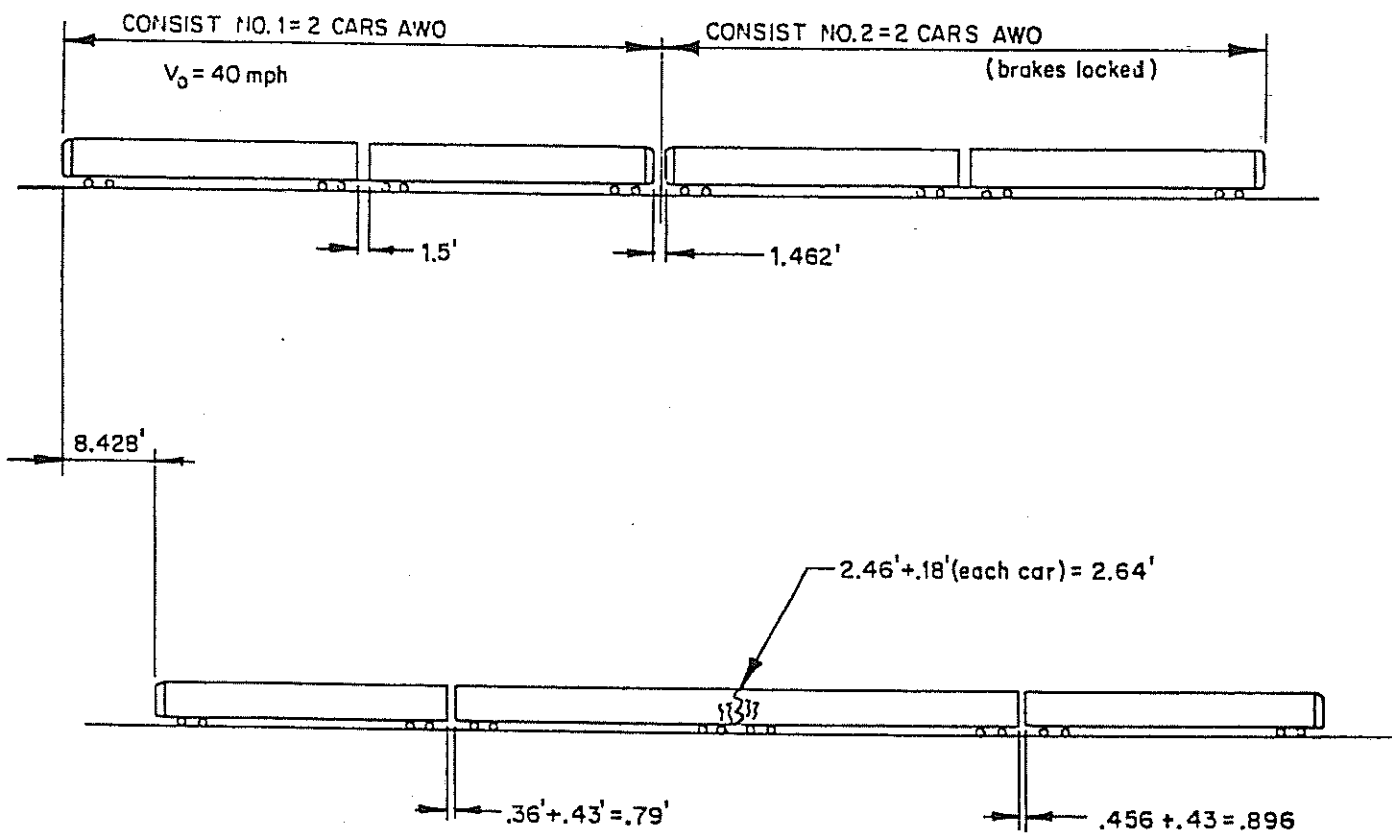


FIGURE 3-5 - PRE & POST IMPACT TRAIN DISPLACEMENTS

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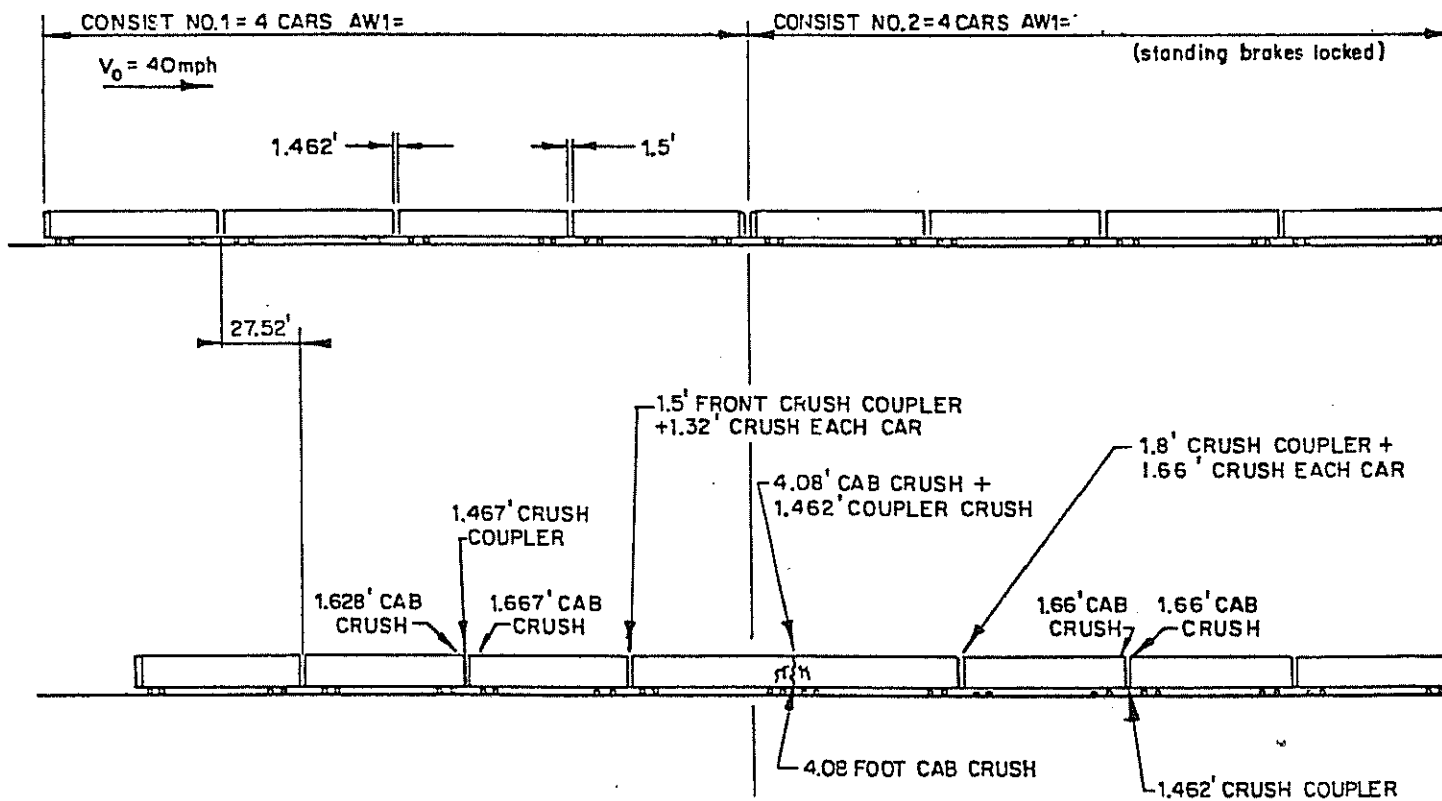


FIGURE 3-6 - PRE & POST IMPACT TRAIN DISPLACEMENT 4-CAR TRAIN

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SECTION 6

DOOR OPERATION AND CONTROL

6.01 DESCRIPTION

A. This section specifies the requirements for side-door, end-door, and cab-door mechanisms, controls, devices, and associated safety and annunciation items for each car.

B. Door Construction and Hardware: See Section 3, entitled "CAR BODY," herein.

6.02 CITED REFERENCES

A. AWS - American Welding Society

1. D1.1-88 Structural Welding Code - Steel
2. D1.2-83 Structural Welding Code - Aluminum
3. D1.3-89 Structural Welding Code - Sheet Steel
4. QC1-88 Qualification and Certification of Welding Inspectors

B. Code of Federal Regulations (CFR)

1. 49-CFR-609 Transportation for Elderly and Handicapped Persons

6.03 SUBMITTALS

A. **Layout Drawings:** Provide system and subsystem schematic and layout drawings of electrical and mechanical systems.

6.04 INTERFACE REQUIREMENTS

A. Side door leaf assemblies shall be completely interchangeable with and equal to GEC-Alsthom door leaf assemblies P/N 0339052101 (LH) and P/N 0339052100 (RH) used on District C-cars.

B. Door operating mechanisms including Connections to Doors, Door Panels and Door Hangers shall be completely interchangeable with the following components used on the District's existing C-cars supplied under Contract 42AA-110.

1. Deleted
2. Deleted
3. Deleted
4. Deleted
5. Deleted
6. Extension Arm LH - Vapor P/N 56930310-01
7. Extension Arm RH - Vapor P/N 56930309-01
8. Hanger, Side Door - Favielley P/N V128017-102

9. Cutout and Panel Sensing Assembly - Vapor P/N 58640193

10. Cutout and Panel Sensing Assembly - Vapor P/N 58640192

11. Door Check Assembly - Vapor P/N 57040051-01

6.05 SIDE DOORS

A. **General:**

1. **Doors:**

a. Provide doors for passenger entrance and exit movement between platform and car. Each doorway shall contain sliding doors of bi-parting leaf type with two leaves per door, opening from center, and retracting completely into pockets in car side wall. A clear door opening of 53.5 inches minimum shall be provided.

b. Door control signals shall be trainlined so that all doors on each side of train may be operated automatically by automatic train control system or manually by train operator at activated console, as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

2. **Power:** Each side door leaf shall be powered by electro mechanical operator.

3. **Operating Time:**

a. Each door leaf shall:

1) Take maximum of one and one-half seconds to move from closed position to within three inches of fully open position.

2) Take not less than two seconds nor more than two and one-half seconds to move from fully open position to fully closed and locked position.

b. Operating speeds shall be adjustable for door synchronization.

c. Door leaves shall decelerate at each extremity, to preclude slamming or rebound, and be brought to rest gently at extremity of door travel.

4. **Closing Force:** Each door leaf shall:

a. Exert closing force of not less than 15 pounds and not more than 30 pounds, as measured at midstroke.

b. Open or close with 60-pound total force applied perpendicularly to center line of interior door surface.

B. **Door Operating Mechanism:**

1. **Door Operators:**

a. Operators and associated hardware shall be located between inner and outer wall surfaces of transit vehicle.

b. Easy access to entire door operator mechanism shall be provided for removal, installation, repairs, and maintenance. Access to door operator mechanism shall be by standard car key only. Access panel shall remain attached to car interior when open.

c. Adjustments shall be readily available from exposed side of door operator.

d. Pivot points and bearings of multiplying lever(s) shall be integral parts of operator package.

e. Connection to doors shall:

1) Be by means of self-aligning arms.

f. Operators and operating linkages shall provide sufficient damping to keep doors from bouncing off their stops at end of either opening or closing cycles.

g. Operators shall hold doors in open position without recycling while cars are standing on grades up to and including, one and one-half percent.

h. All fasteners between door leaves and over-centering limit switches shall be lockwired complying with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

i. All welds shall be in accordance with AWS specifications D1.1-88, D1.2-83, D1.3-89 as applicable. Welding shall be inspected and approved by a inspector certified under AWS specification QC1-88.

j. General: Door Operating Mechanisms shall:

1) Be as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

2) Be designed to preclude unintentional signals from operating doors.

2. Power: Doors shall operate from low-voltage circuit with voltage characteristics as specified in Section 9, entitled "AUXILIARY ELECTRICAL EQUIPMENT," herein.

a. When car is in layup status, door system shall draw no power when doors are either closed or open.

3. Operator motors shall:

a. Be protected against thermal overload by cutout switch or device which shall automatically reset when cooled.

b. Not be subject to damage by attempts to move doors in stalled condition or with intermittent operation of thermal overload cutout switch or device.

4. Release Switches and Locks:

a. Door linkage between door operator motor and its door leaf shall contain an over-center linkage geometry or equivalent mechanism that shall prevent manual opening of closed door leaf under normal conditions.

b. Integral emergency operation shall be capable of providing, without use of any key or electrical power, emergency release from:

1) Inside cars on four door leaves near car centers (Numbers 3, 4, 5, and 6).

2) Outside cars for door leaves numbered four and five with accessibility in car crew step. Protection shall be provided for the release handle as shown on Contract Drawings.

c. Emergency release mechanism upon actuation shall interrupt door indication trainline and not allow doors to open until zero-speed indication is received.

d. Emergency release access doors shall be provided with spring-loaded covers.

e. Key-controlled cutout switch shall be located at each side door operator, readily accessible for crew use and capable of complying with following requirements:

1) In event of single operator failure:

a) It shall be possible to make such operator "electrically inoperative" and "electrically inoperative with door leaf mechanically locked in closed position". Additionally, such locking procedure shall activate cutout switch signal circuit.

b) Other door leaf in opening affected shall continue to operate.

c) When in the "electrical inoperative" only position the Door Cutout Switch Panel access door will be prevented from being closed and locked.

d) Access to the cutout switch shall not expose the door operator mechanism.

5. Operator limit switches shall:

a. Be replaceable-unit type complying with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

b. Be designed and installed such that if they are replaced, no adjustments shall be necessary to obtain proper functioning.

c. Have "door closed" indication which shall be given only after leaves are positively closed and locked. Additionally, this indication shall be activated by door leaves.

C. Door Control Systems:

1. General: Control systems shall:

a. Be as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

b. Be designed to preclude unintentional signals from operating doors.

2. Trainlined Door Operation:

Door Operation and Control

603

a. Operate from trainlined control to provide separate control components for opening and closing doors on both sides of cars, complying with following and as indicated:

1) Doors of train shall unlock, open, and remain open on continuous, trainlined, low-voltage signal unfiltered and unregulated. Additionally, removal of signal shall automatically close doors.

3. Local Operation:

a. Door panels numbered two and four and five and seven as indicated shall be designed to open or close electrically from outside by using standard car key.

b. All door sets shall be designed to open or close electrically, from controls inside car, by using standard car key.

c. Local door controls:

1) Positive action shall be required to open and close doors from either actuating location. Additionally, it shall be possible to remove key following any actuation to facilitate routine entry and exit by maintenance personnel.

2) Doors opened by local control shall close after doors are opened and then closed by trainline control.

3) Crew Switches:

a) Interior: Provide switches placed in readily accessible location adjacent to doors.

b) Exterior: Provide switches located as shown on Contract Drawings.

4. Door Closing Warning:

a. Tone Initiation, reference Section 14, entitled "TRAIN CONTROL", herein.

b. Visual warning signals shall be provided to alert passengers of closing doors in compliance with 49-CFR-609, Transportation for Elderly and Handicapped Persons.

5. Obstruction Detection: Door edge shall:

a. Be tongue-and-grooved as indicated and constructed of resilient material complying with requirements of Section 19, entitled "MATERIALS AND WORKMANSHIP," herein.

b. Have sufficient stiffness to prevent side doors from locking when solid test specimens two inches wide by three-eighths inch thick, or three-quarters inch diameter bar are individually inserted between leaves.

6. Door Pulsations: Door circuit system shall include timing circuit, which in event door panel or panels are obstructed during closing cycle, shall automatically interrupt motor circuit three seconds after start of closing operation and then attempt to close panels in six-second intervals until panels are completely closed and locked.

D. Interlocking: Interlock and detection circuits are safety critical circuits. Provide following control interlocking when operating as lead car of train:

1. Door Controls:

a. Shall be so interlocked that doors cannot be opened until train berthing signals and train zero speed signal are generated by automatic train operation as specified in Section 2, entitled "SYSTEM REQUIREMENTS," herein.

b. Shall have automatic bypass of berthing signals in "Yard Manual" mode.

2. Traction Control: Input signals to traction system shall be so interlocked with door control system that no train can be moved in any mode of operation except Yard Manual until all doors are closed and locked on each car. Additionally, if any door is opened while train is in motion, an irretrievable open-loop brake application shall be initiated.

a. Provide door interlock by-pass switch and circuit as indicated to enable emergency train movement.

E. Door Signals:

1. Door control system sensors with normally open contacts shall provide necessary logic to annunciator system, as specified in Section 9, entitled "AUXILIARY ELECTRICAL EQUIPMENT," herein, to indicate the following:

a. C-car:

1) Side Doors not fully closed and locked.

2) Flipper Doors not fully closed and locked or fully open and locked.

b. B-car:

1) Side Doors not fully closed and locked.

2. Local Status Annunciator:

a. Provide annunciator at each door leaf to indicate leaf status. Annunciator to be energized to indicate door is not closed and locked and has not been cut out.

F. Door Diagnostics:

1. Provide diagnostic system that shall continuously monitor operation of side doors and side door controls, and record and save any operational faults in a non-volatile memory with a minimum eight Kbytes capacity. Fault memory shall be resettable at the primary maintenance level. Additionally, a data logger shall be provided and shall reside in non-volatile memory. This information shall be examined or retrieved by using a terminal as specified in Section, 15 entitled "SYSTEM SUPPORT," herein. All fault data shall be preserved in Battery Backed RAM.

2. Each fault shall be time dated and recorded in Pacific Standard Time (PST).

3. Fault data examined or retrieved shall be displayed in English, display shall indicate fault type without the use of cross references.

4. In addition to operational faults the diagnostic system shall record the following:

a. Door leaf(s) opened in yard manual mode of operation.

6.06 END DOORS

A. General: Doors shall not require opening force in excess of:

1. C-car X-end, and B-car X-end and Y-end - 20 pounds
2. C-car Y-end - 15 pounds

B. C-car Y-End Door: Door shall:

1. Be operated manually and close automatically when released.
2. Open by pushing door to left (from inside car) into door pocket in end wall. Additionally, provide recess in door casing to prevent injury to personnel.

C. C-car X-end and B-car X-end and Y-end doors: Doors shall:

1. Be operated manually, be double sliding into door pockets, and be automatically returned to normal closed position when released.

6.07 C-CAR FLIPPER DOORS

A. Doors shall be:

1. Positively latched in both open and closed positions.
2. Locked when in closed position and require use of standard car key to unlock.
3. Provided with signals which shall, when doors are closed and latched allow control logic to determine that car is in end-of-train position: when open and latched, allow operation as mid-train car including hostling function; and, when not latched, prevent operation from adjacent cab in any mode. Additionally, provide bypass circuit for both modes.

6.08 SPECIAL TEST EQUIPMENT

A. Provide test equipment as specified in Section 15, entitled "SYSTEM SUPPORT," herein.

EXHIBIT “E”

C1 and C2 Car - X and Y End Drawings

1. Illustrated Parts Catalogue X- End Figure 7-72A
2. Illustrated Parts Catalogue Y- End Figure 7-73A
3. Car Without Trucks, Drawing # 339733, sheet 1
4. X-End Assembly, Drawing # 344200, sheet 1
5. X-End Plating, Drawing # 344201, sheet 1
6. Car Shell and Y-End Joint Detail, Drawing # 343856, sheet 1 and 2
7. Y-End Frame, Drawing # 344708, sheet 1 thru 7
8. Car Body Assembly, Drawing # 343995, sheet 1 thru 5
9. Y-End Assembly, Drawing # 337832, sheet 1 thru 3

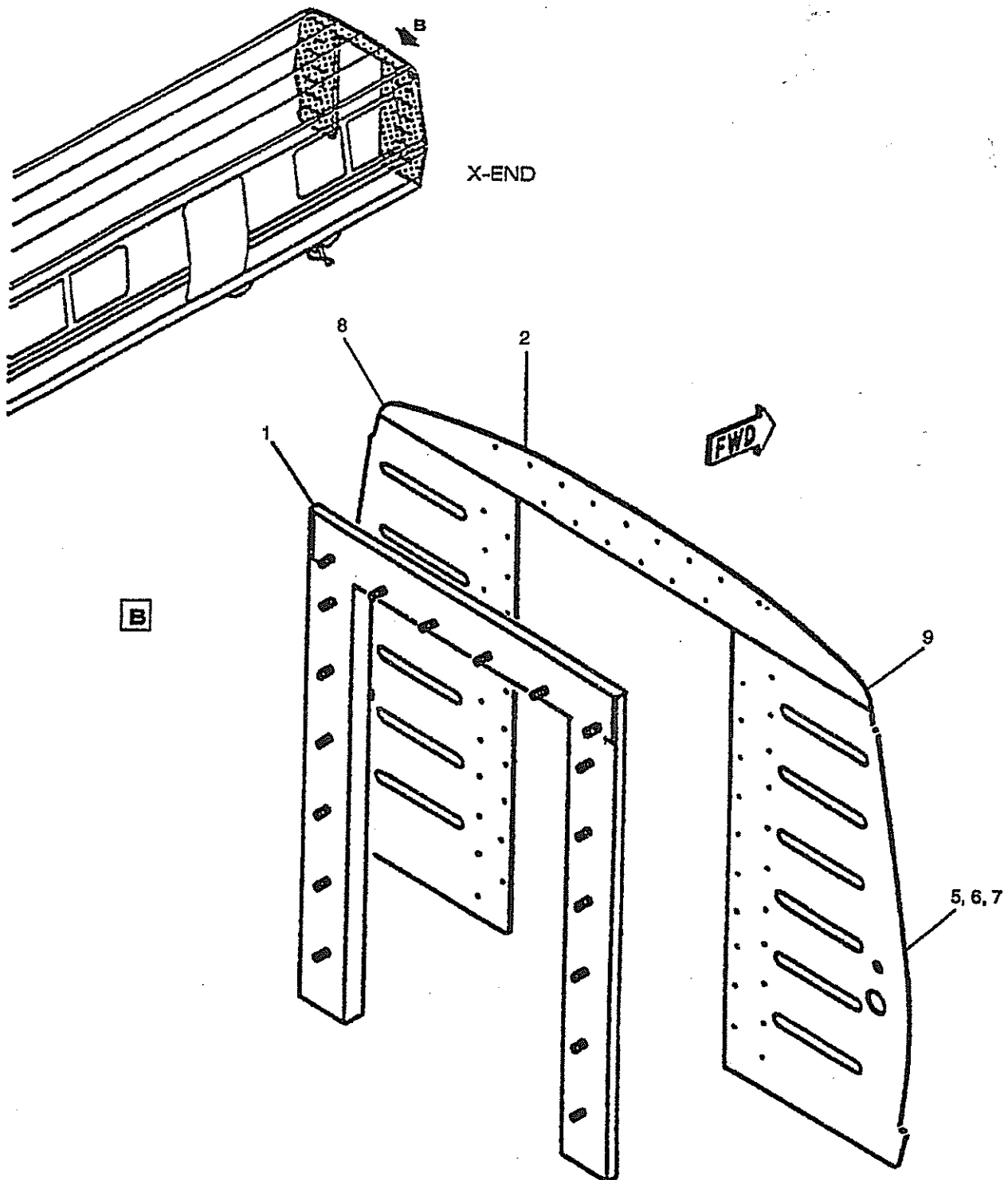


Figure 7-72A X-End Assembly (C2)

IR007967

Rev. Jan/98

Book 50
Volume 12
Ch 7-Illus
Page 7-245

ILLUSTRATED PARTS CATALOG

FIG	INDEX	GROUP	SUB Group	Part Number	DESCRIPTION	USAGE	QTY
7-72	0	19	11	29603	X-End Assembly, MK P/N 344200, NHA 7-1-11	C2	
7-72	1	20	11	4910Y	Associated Frame, X-End, MK P/N 338948	C2	1
7-72	2	20	11	4911Y	Associated Plating, X-End, MK P/N 344201	C2	1
7-72	3	19	11	76548	Sheet, RH	C2	
7-72	4	19	11	76543	Sheet, LH	C2	
7-72	5	20	11	4912Y	Putty, Silver, Terostat Type AC, MK P/N 018463153	C2	A/R
7-72	6	20	11	4913Y	Rivet, MK P/N 0021152	C2	57
7-72	7	20	11	4914Y	Putty, Silver, Terostat Type 9010, MK P/N 018464018	C2	A/R
7-72	8	20	11	4915Y	Gutter, Endpiece, MK P/N 347224101	C2	1
7-72	9	20	11	4916Y	Gutter, Endpiece, MK P/N 347224102	C2	1

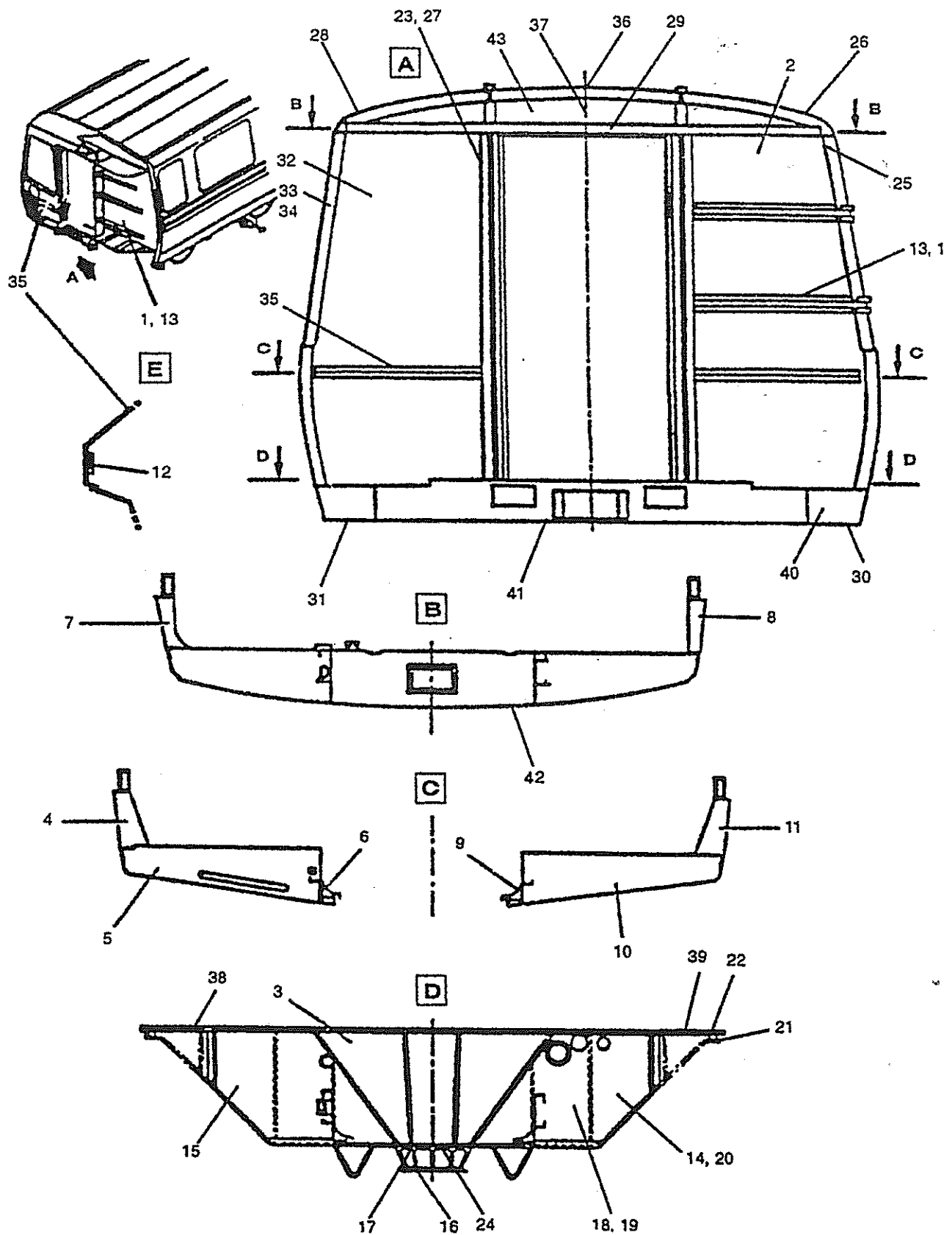


Figure 7-73A Y-End Assembly (C2)

ILLUSTRATED PARTS CATALOG

FIG	INDEX	GROUP	SUB Group	Part Number	DESCRIPTION	USAGE	QTY
7-73	0	20	11	4918Y	Y-End Assembly, MK P/N 337832, NHA 7-1-11	C2	
7-73	1	20	11	4919Y	Sheet, Y-End, MK P/N 338346	C2	1
7-73	2	20	11	4920Y	Sheet, Y-End, MK P/N 344708	C2	1
7-73	3	20	11	4921Y	Shell Box Upper Plate, MK P/N 347041	C2	1
7-73	4	20	11	4923Y	Reinforcement, Folded Plate, MK P/N 337832004	C2	2
7-73	5	19	11	76533	Front Part, Left Side, MK P/N 338346001	C2	1
7-73	6	20	11	4927Y	Support, MK P/N 347258000	C2	2
7-73	7	20	11	4928Y	Reinforcement, Folded Plate, MK P/N 347143101	C2	2
7-73	8	20	11	4929Y	Folded Plate, MK P/N 347143102	C2	1
7-73	9	20	11	4927Y	Support, Plate, MK P/N 347258000	C2	1
7-73	10	19	11	76538	Front Part, Right Side, MK P/N 338346002	C2	1
7-73	11	20	11	4935Y	Folded Plate, MK P/N 337832023	C2	1
7-73	12	20	11	4936Y	Tightener, MK P/N 347756	C2	2
7-73	13	20	11	4937Y	Folded Plate, MK P/N 337832005	C2	2
7-73	14	20	11	4938Y	Skinplate, MK P/N 347042101	C2	
7-73	15	20	11	4942Y	Skinplate, MK P/N 347042102	C2	1
7-73	16	20	11	4943Y	Tube, 1 in. dia., .098 in. THK, MK P/N 337832012	C2	2
7-73	17	20	11	4944Y	Tube, 13/16 in. dia., .059 in. THK, MK P/N 338486010	C2	5
7-73	18	20	11	4945Y	Tube, 1 in. dia., .098 in. THK, MK P/N 343984013	C2	2
7-73	19	20	11	4946Y	Sheet, 0.118 X 3.145 X 9.783, MK P/N 340837000	C2	2
7-73	20	20	11	4949Y	Sheet, 0.118 X 1.968 X 9.783, MK P/N 340836000	C2	1
7-73	21	20	11	4950Y	Tube, 1 3/16 in. dia., .098 in. THK, MK P/N 341275002	C2	2
7-73	22	20	11	4951Y	Sikaflex 221 Putty, MK P/N 337832018	C2	A/R
7-73	23	20	11	4955Y	Sika Primer, MK P/N 337832019	C2	A/R
7-73	24	20	11	4956Y	Flat Support, MK P/N 337832020	C2	1
7-73	25	20	11	4957Y	Upper Gusset, MK P/N 347370000	C2	1
7-73	26	20	11	4959Y	Roof Canopy, RH, MK P/N 338346004	C2	1
7-73	27	20	11	4963Y	Sheet Joint Doubler, MK P/N 337832027	C2	2
7-73	28	20	11	4965Y	Sheet Joint Doubler, MK P/N 337832028	C2	2
7-73	29	20	11	4966Y	Door Header, MK P/N 338346007	C2	1
7-73	30	20	11	4972Y	Skirt Bottom, RH, MK P/N 338346006	C2	1
7-73	31	20	11	4976Y	Skirt Bottom, LH, MK P/N 338346005	C2	1
7-73	32	20	11	4980Y	Windshield Reinforcement, MK P/N 338346008	C2	1
7-73	33	20	11	4987Y	Windshield Reinforcement, MK P/N 338346009	C2	1
7-73	34	20	11	4988Y	Windshield Reinforcement, MK P/N 338346011	C2	1

ILLUSTRATED PARTS CATALOG

FIG	INDEX	GROUP	SUB Group	Part Number	DESCRIPTION	USAGE	QTY
7-73	35	20	11	4996Y	Windshield Reinforcement, MK P/N 338346010	C2	1
7-73	36	20	11	5000Y	Sheet Joint Doubler, MK P/N 337832037	C2	1
7-73	37	20	11	5001Y	Sheet Joint Doubler, MK P/N 337832039	C2	1
7-73	38	20	11	5009Y	Box Closing Sheet, MK P/N 344637002	C2	1
7-73	39	20	11	5016Y	Box Closing Sheet, MK P/N 344637003	C2	1
7-73	40	20	11	5023Y	Joint Doubler, MK P/N 377832042	C2	1
7-73	41	19	11	13090	Center Sill Assembly, Dwgs 014991, 015553, 015554, 015527, 015528	C2	1
7-73	42	19	11	76528	Sheet, Top Center, P/N 0338346023	C2	1
7-73	43	19	11	76528	Sheet, Front Center, P/N 0338346003	C2	1

APPLICATIONS		DWG NO	MK REVISIONS				
Voiture C, ensemble		339734	ZONE	REV	DESCRIPTION	DATE	APPROVED
14	Aménagement intérieur Intérieur arrangement	339637	ALL	A	Incorporated ECN 339733 - B1	9/25/82	[Signature]
13	Garnissage cabine Cab lining	339504			RECEIVED	9/25/82	[Signature]
12	Montage bloc et appareils électriques Electrical units and equipments	339938			RECEIVED	9/25/82	[Signature]
11	Garnissage compartiment Passenger area lining	339497			RECEIVED	9/25/82	[Signature]
10	Équipement, cablage, caisse Car body wiring equipment	339785			RECEIVED	9/25/82	[Signature]
9	Aménagements extérieurs Exterior arrangements	339649			RECEIVED	9/25/82	[Signature]
8	Peinture et isolation Painting and insulation	339618			RECEIVED	9/25/82	[Signature]
7	Chassis, équipement Underframe equipment	340161			RECEIVED	9/25/82	[Signature]

ZONE	REV	DESCRIPTION	DATE	APPROVED
6	343955000	Chaudron Shell	343 995	
5	339494000	Équipement sous chassis climatisation Underframe equip. air condition.	339494	
4	339779000	Équipement de câblage sous chassis Underframe wiring equipment	339779	
3	339700000	Ensemble schéma de principe Schematics wiring diagrams	339700	
2	339627000	Pneumatique hydraulique Pneumatic hydraulic system	339627	
1				

Requière	Identification	On	Description des pièces	Matériau, norme, spécifications techniques	Requière
Requière	339733000	X	Voiture C sans bogie C Car without trucks	Matériau, norme, spécifications techniques	Requière

Requière	Identification	On	Description des pièces	Matériau, norme, spécifications techniques	Requière
Requière	339733000	X	Voiture C sans bogie C Car without trucks	Matériau, norme, spécifications techniques	Requière

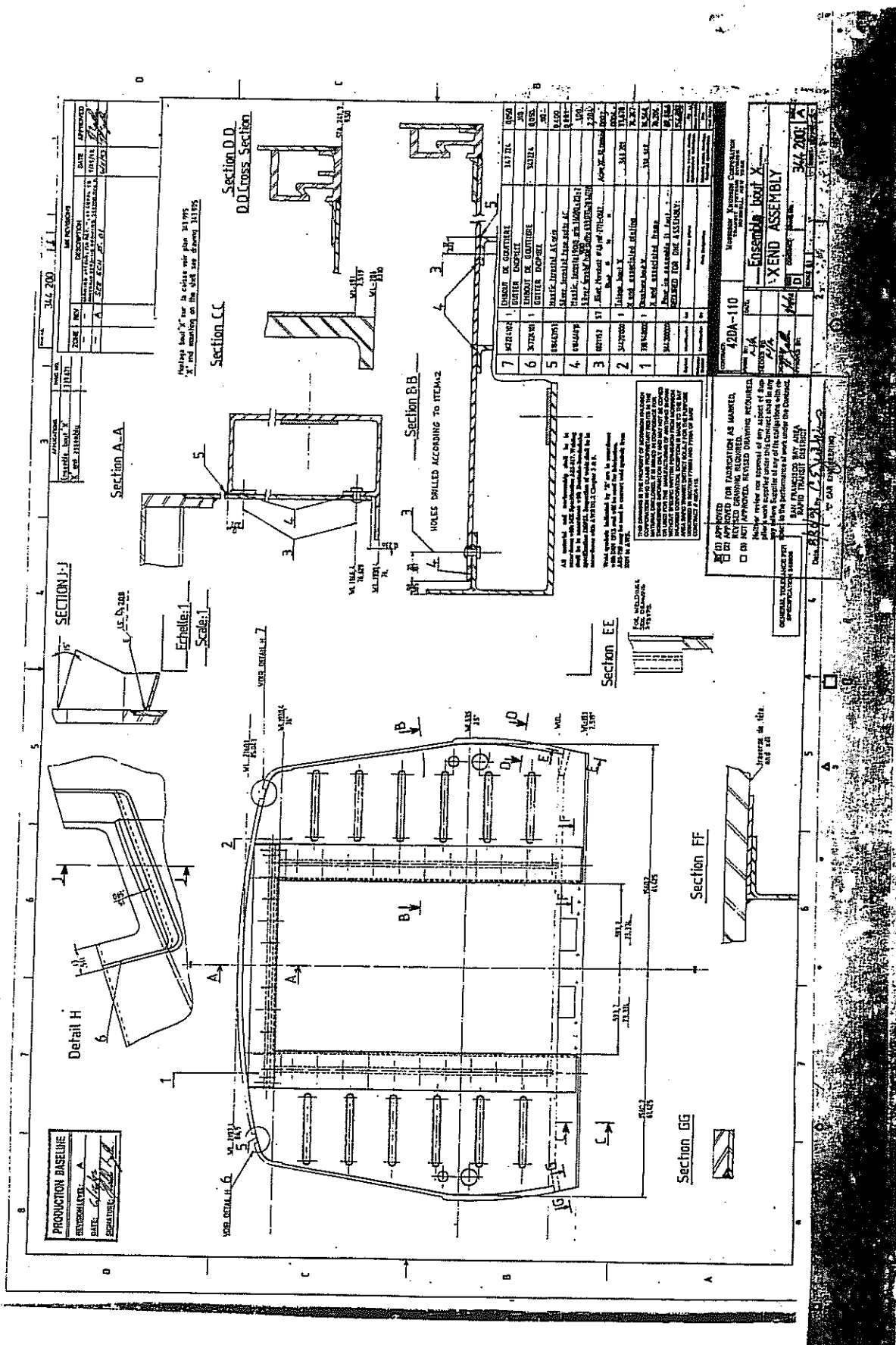
CONTRACT: 42DA-110		MORRISON KNUDSEN CORPORATION TRANSIT SYSTEMS DIVISION HORNELL, NEW YORK	
DATE:	TITLE:	DATE:	TITLE:
—	—	—	VOITURE C SANS BOGIE
—	—	—	C CAR WITHOUT TRUCKS
SIZE: 9/65/82	REF. No. B	DWG. No.	339733
SCALE: 10/1/82	BART STOCK No.	SHEET	1 OF 1

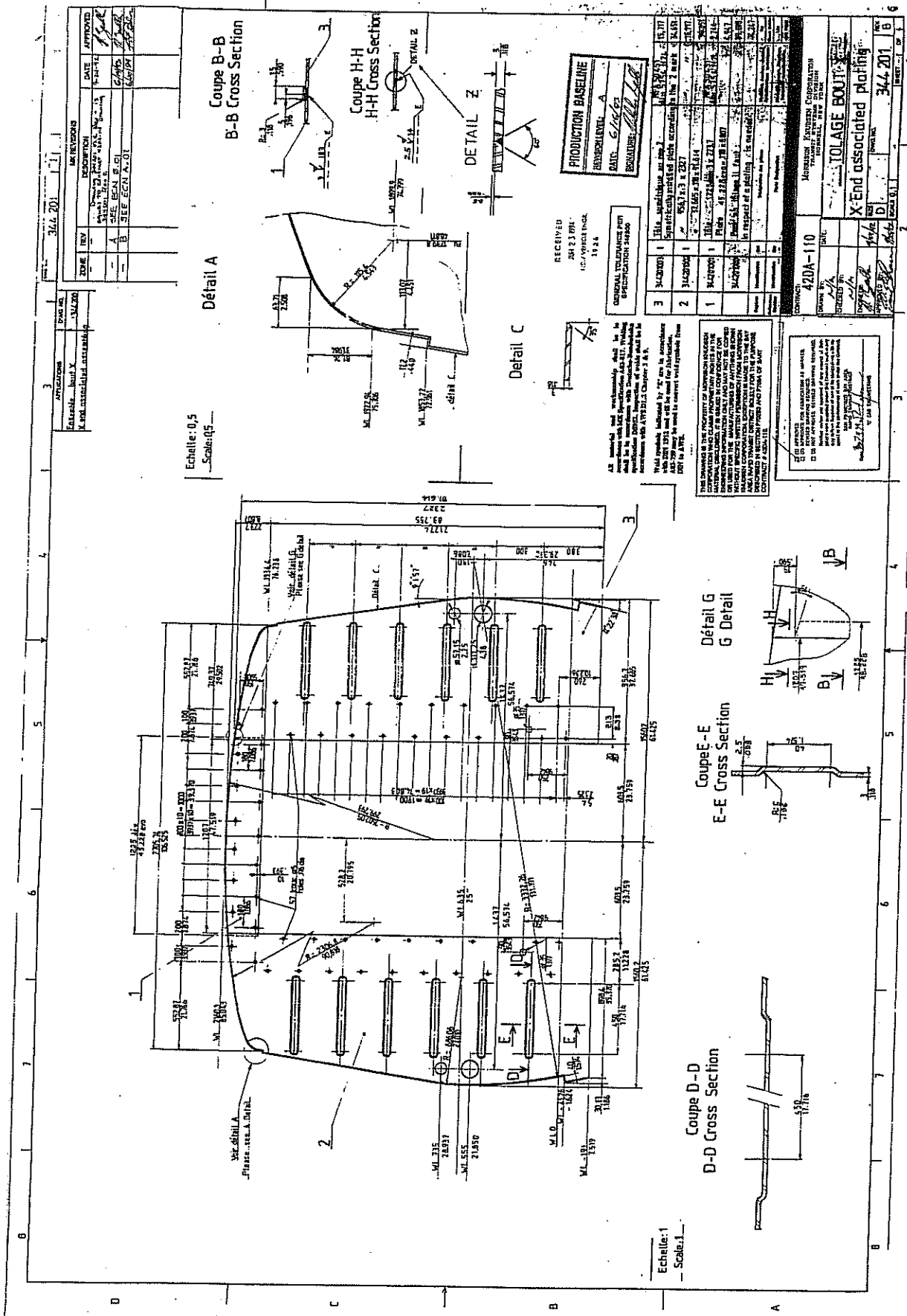
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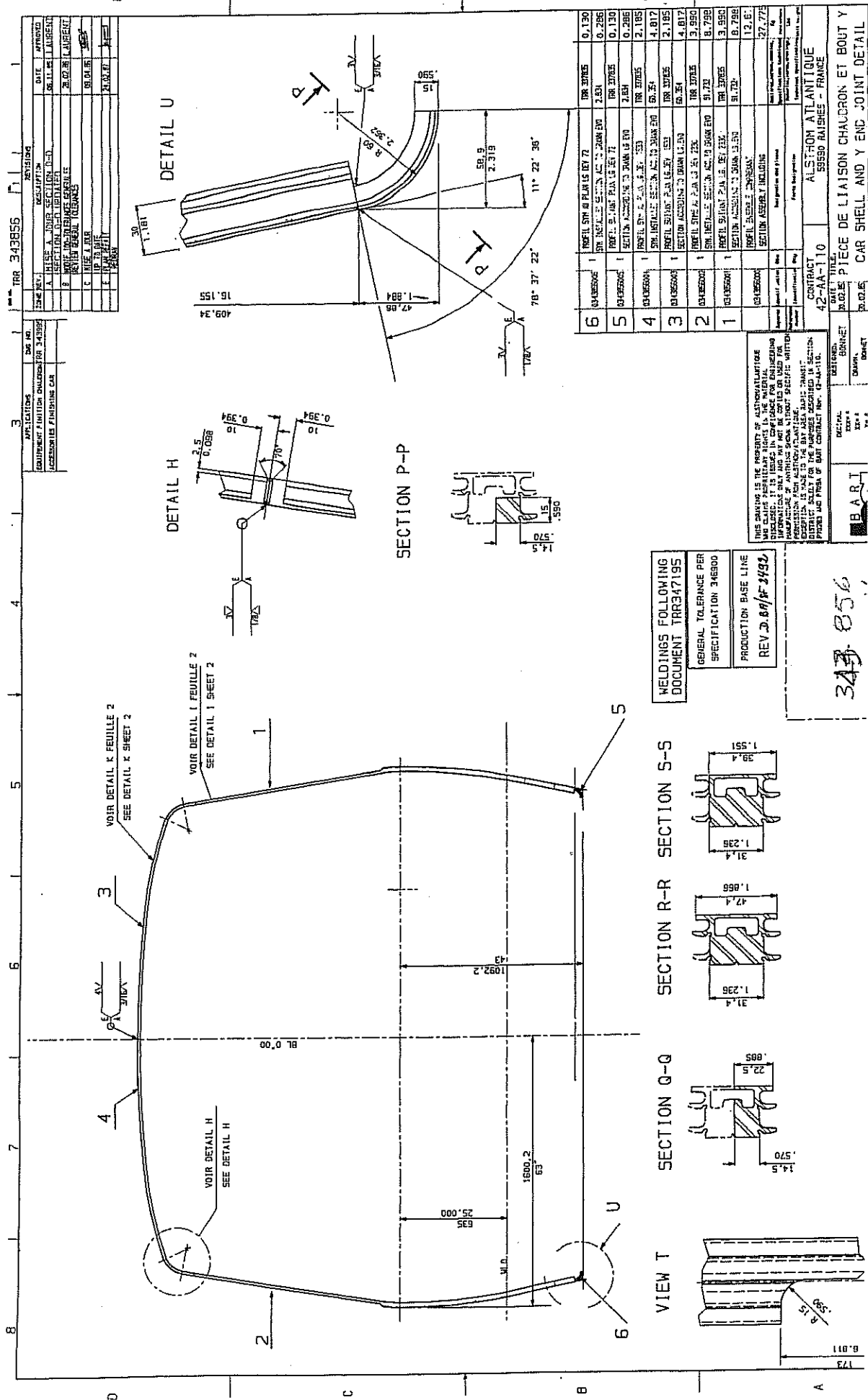
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N/A	N/A	J. J. J.	J. J. J.

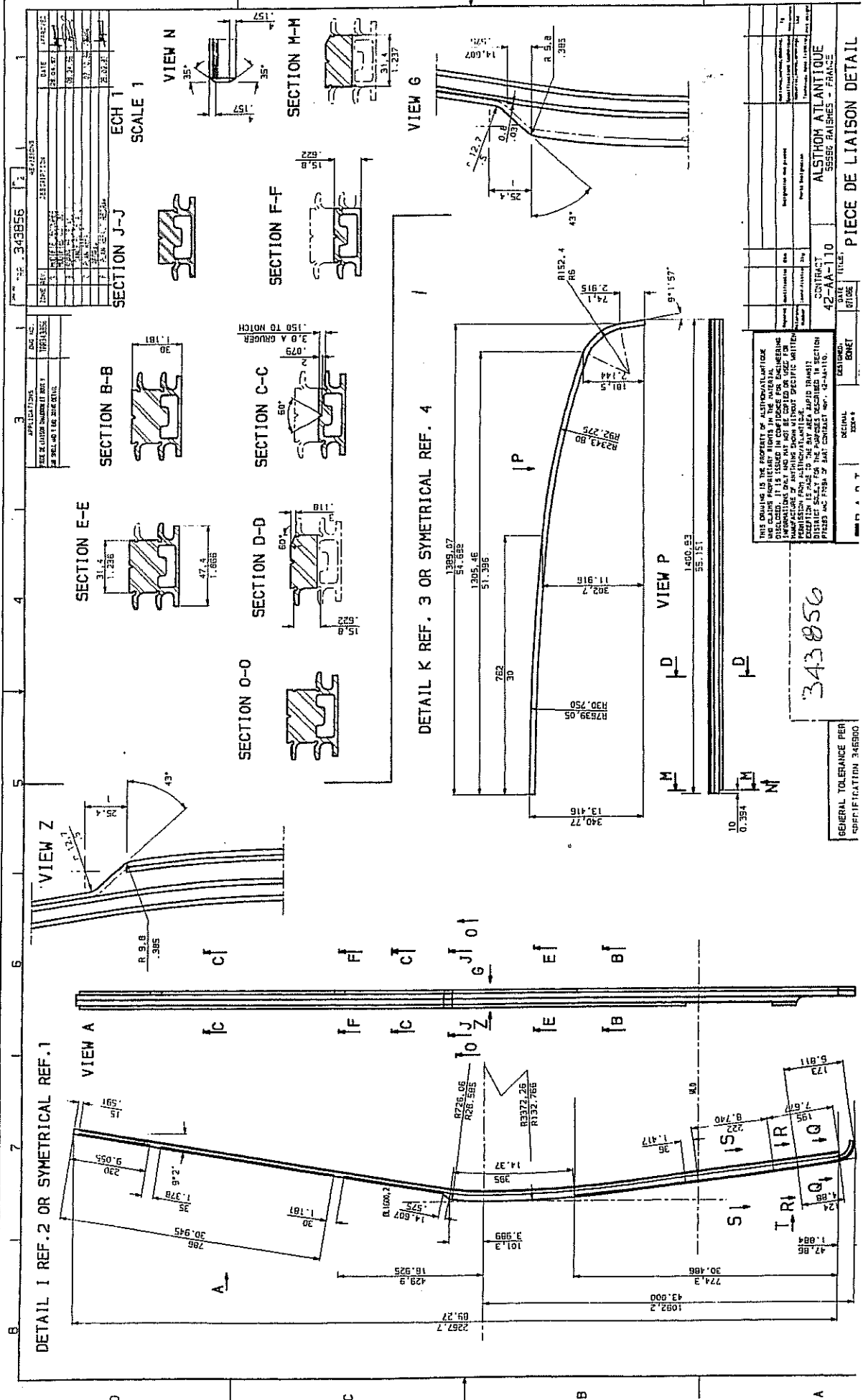
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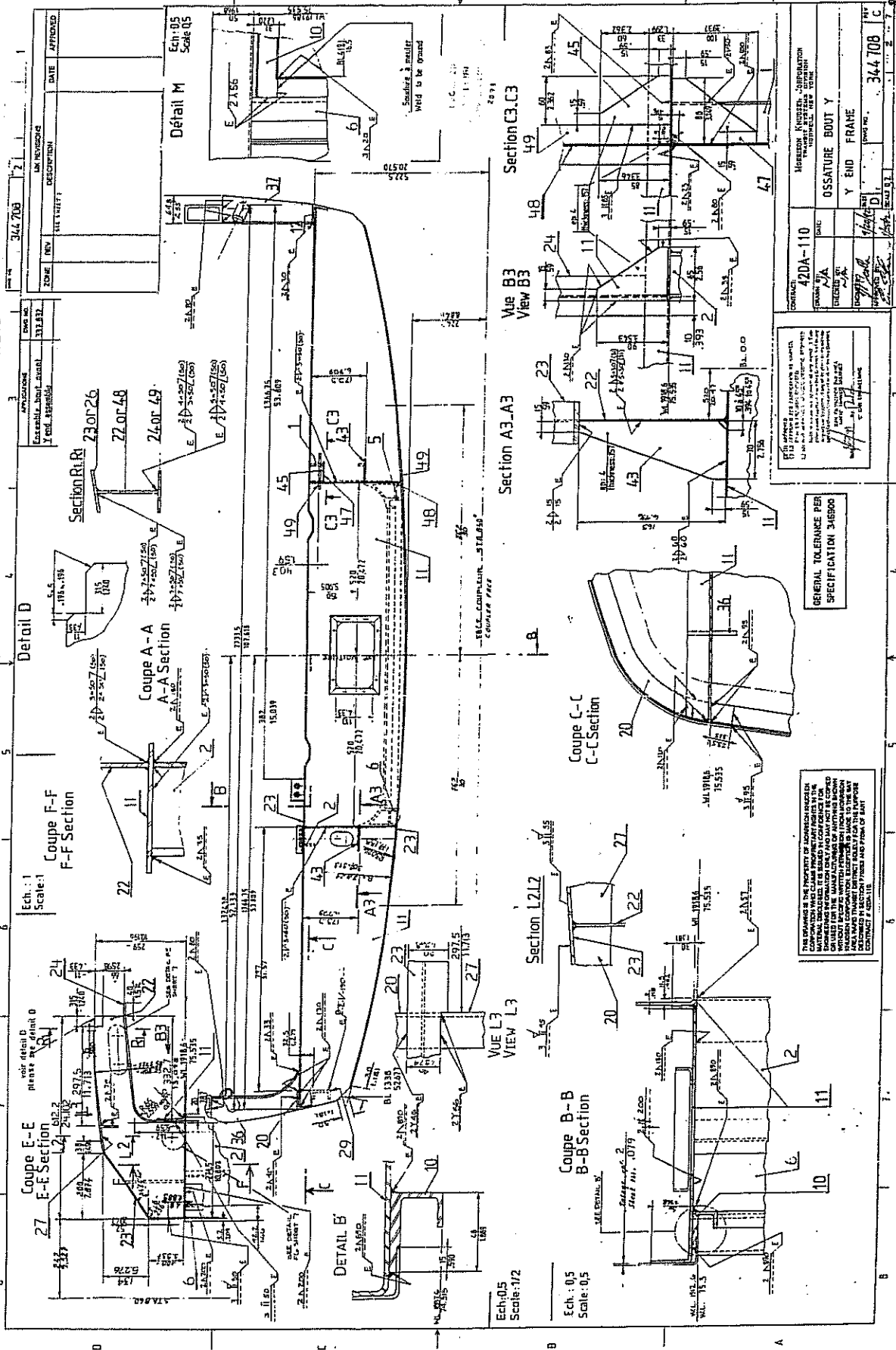
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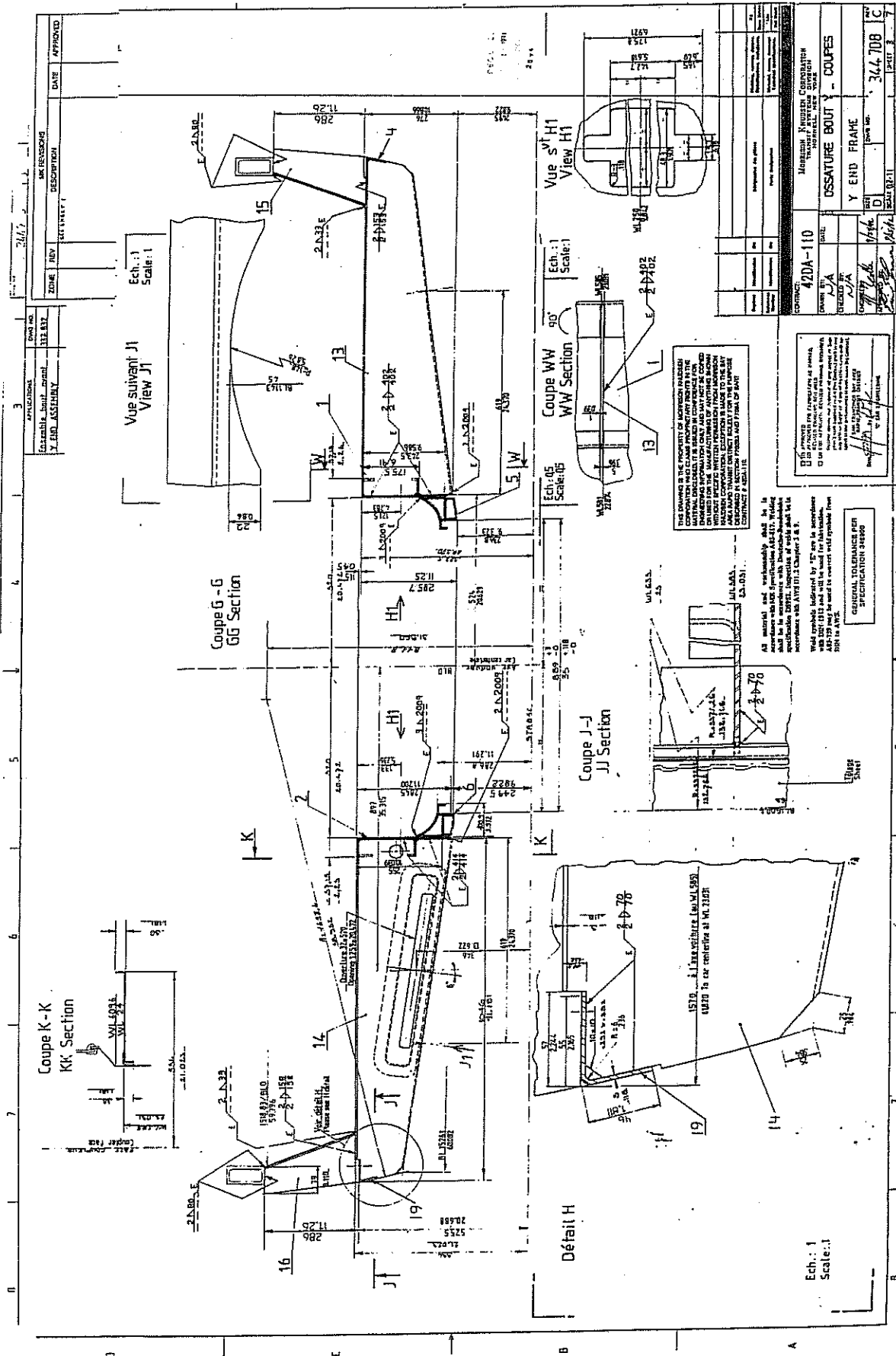


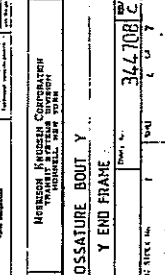













CONTRACT NO.	42DA-110	DATE:	TITLE:	STAT	INT NO	BLANK
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				9/6/52	9/6/52	9/6/52

	SERIAL 312-1 312-1 312-1 FUNCTION 1 ANALOG 1	DRAWN BY N/A CHECKED BY N/A TOLERANCE 1/32"	APPROVED BY [Signature]
	TO BE BUILT IN THE UNITED STATES OF AMERICA		

DECLASSIFY ON: A

DATE: 11/11/2011

BY: 60322

100-443887-1000

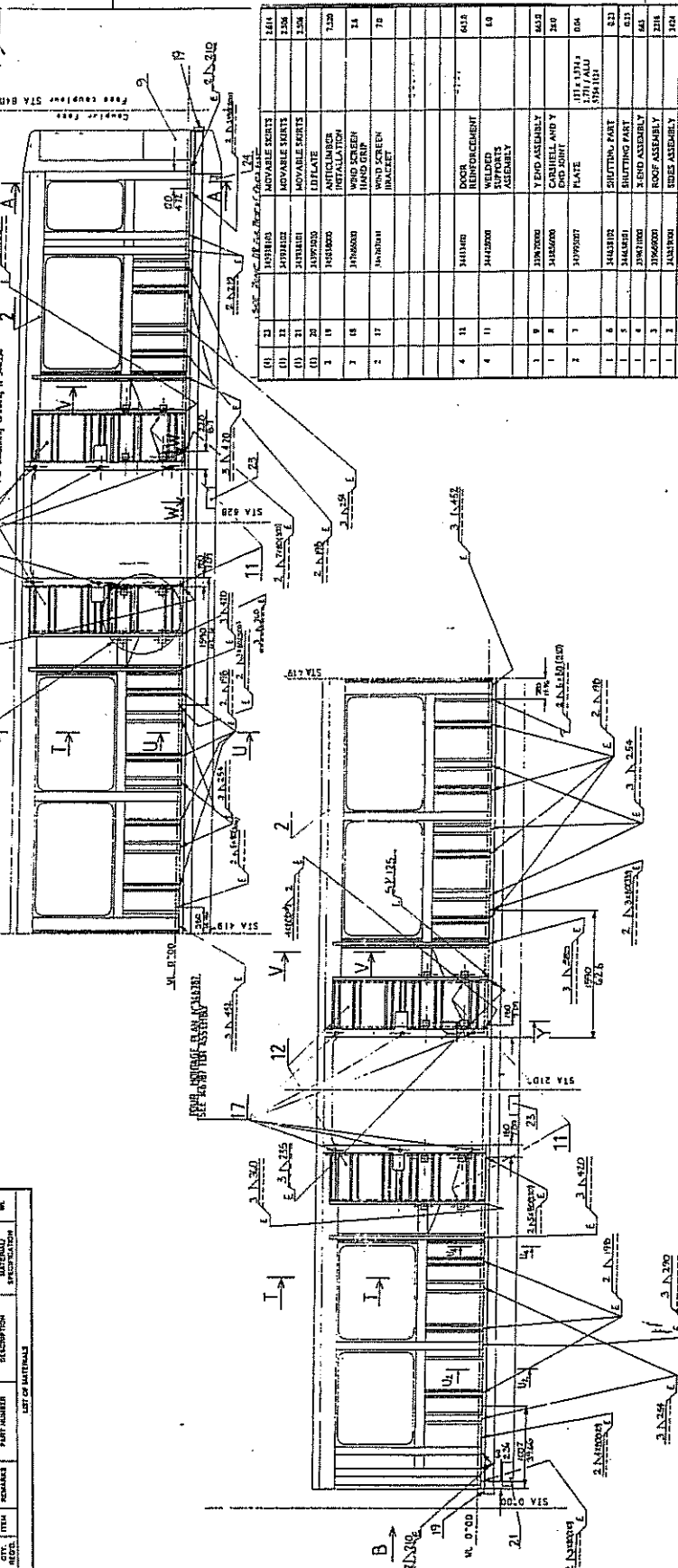
ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED EXCEPT WHERE SHOWN OTHERWISE

DATE 11/11/2011 BY 60322

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(a)	27	SEC NOTE 4	PLATE	181A 2091 101 181A 2091 101 25%	250
(b)	28	SEC NOTE 3	PLATE	181A 2091 101 181A 2091 101 25%	250
(c)	27		SEALANT	SEALANT 221 181A 2091 101 100%	100
(d)	28		PLATE	181A 2091 101 181A 2091 101 100%	100
(e)	25	2025B201	MOVABLE SKIRTS		210
(f)	25	2025B201	MOVABLE SKIRTS		210
(g)	25	2025B201	MOVABLE SKIRTS		210

8 Four mortgage plans 1 174 86
SEE 174 86 FOR ADDRESS ONLY V



QTY. REQD.	ITEM NO.	REMARKS	PART NUMBER	DESCRIPTION	MATERIAL SPECIFICATION
4	11		3411400	DOOR REINFORCEMENT	
4	11		34142008	WELDED SUPPORTS ASSEMBLY	
1	8		31282000	2 END ASSEMBLY	
1	8		34162000	2 END ASSEMBLY AND Y	
1	3		34192007	FLATE	131 x 1314 x 171 / ALU 314111
1	2		3423102	SHUTTING PART	
1	2		3424101	SHUTTING PART	
1	4		2981700	2 END ASSEMBLY	
1	2		21662000	ROOF ASSEMBLY	
1	2		3421700	FILES ASSEMBLY	
1	1		21662000	UNDER FRAME ASSEMBLY	
2	8		3417100	2 END ASSEMBLY	

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GENERAL TOLERANCE PER
SPECIFICATION 346500

[illegible]

Material and workmanship shall be in accordance with AISC Specification A32-417. Welding shall be in accordance with Deutsche Standard specification D3931. Inspection of welds shall be in accordance with AWS D11.2 Chapter 3.4.9.

NOTES:
 1) FOR SECTIONS AA-AA SEE 5m; 2)
 2) FOR SECTIONS TT, UU, VV, W, X, YY, ZZ, SEE 5m; 4
 3) ITEM # 25 IS USED ON CARS #26, 26C, AND 2507 ONLY.
 4) ITEM # 1 IS MADE FROM UPPER PLANK OF A SIDE SILL.
 5) ITEM # 20 IS USED ON CARS #262 TO 2506, 2508
 AND 2510 ONLY.

[illegible]

69-7

SAN FRANCISCO DISTRICT

RECEIVED

OCT 10 1968

FBI - SFO

TO : SAC, CHICAGO

FROM : SAC, SAN FRANCISCO

MURDER OF MARTIN LUTHER KING, JR.

RE: [illegible]

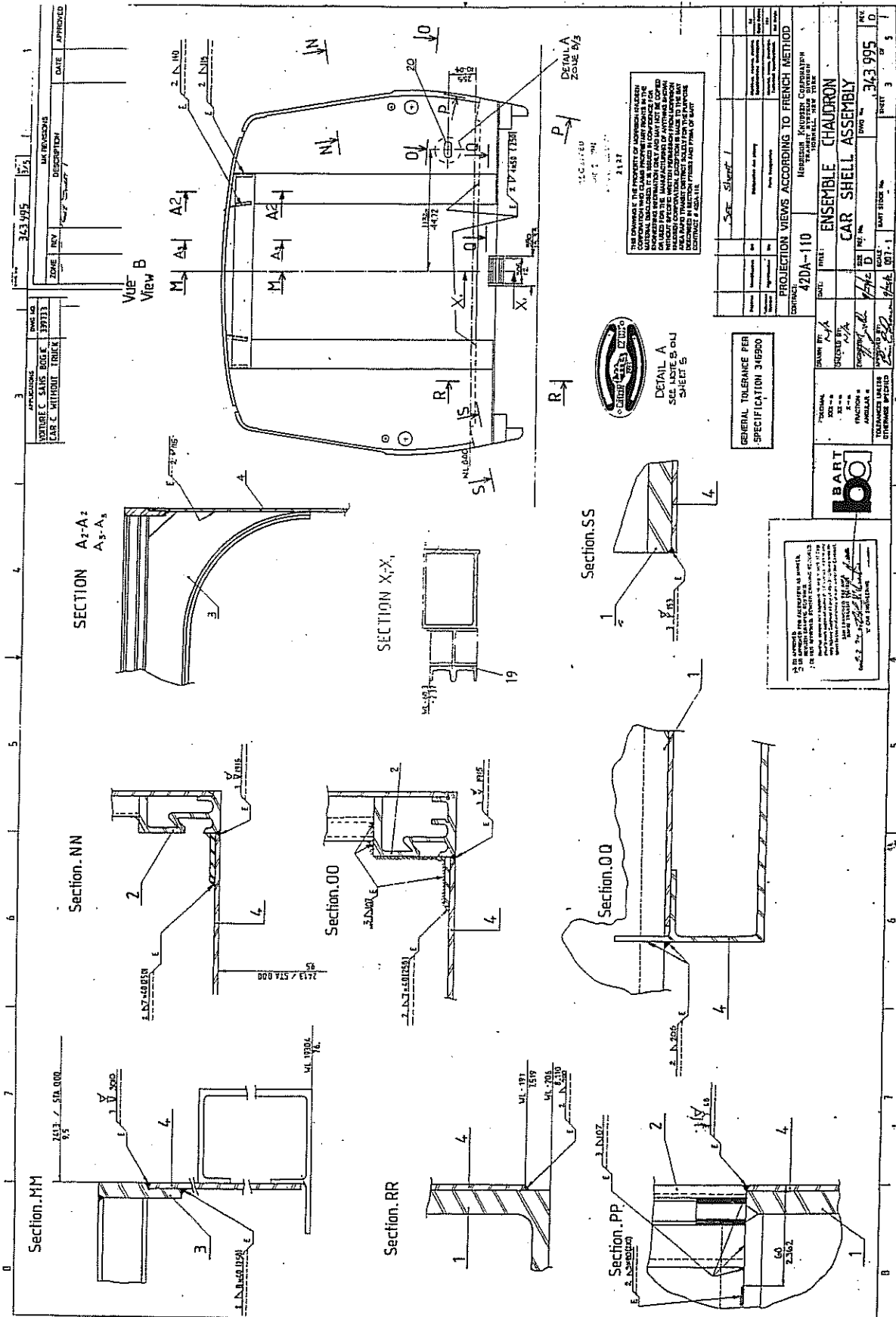
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Material and workmanship shall be in accordance with AISC Specification AISC-317. Welding shall be in accordance with AWS D5.1 Structural Steel Specification D5.1.3. Impurities of weld shall be in accordance with AWS D11.2 Chapter 3.4.5.

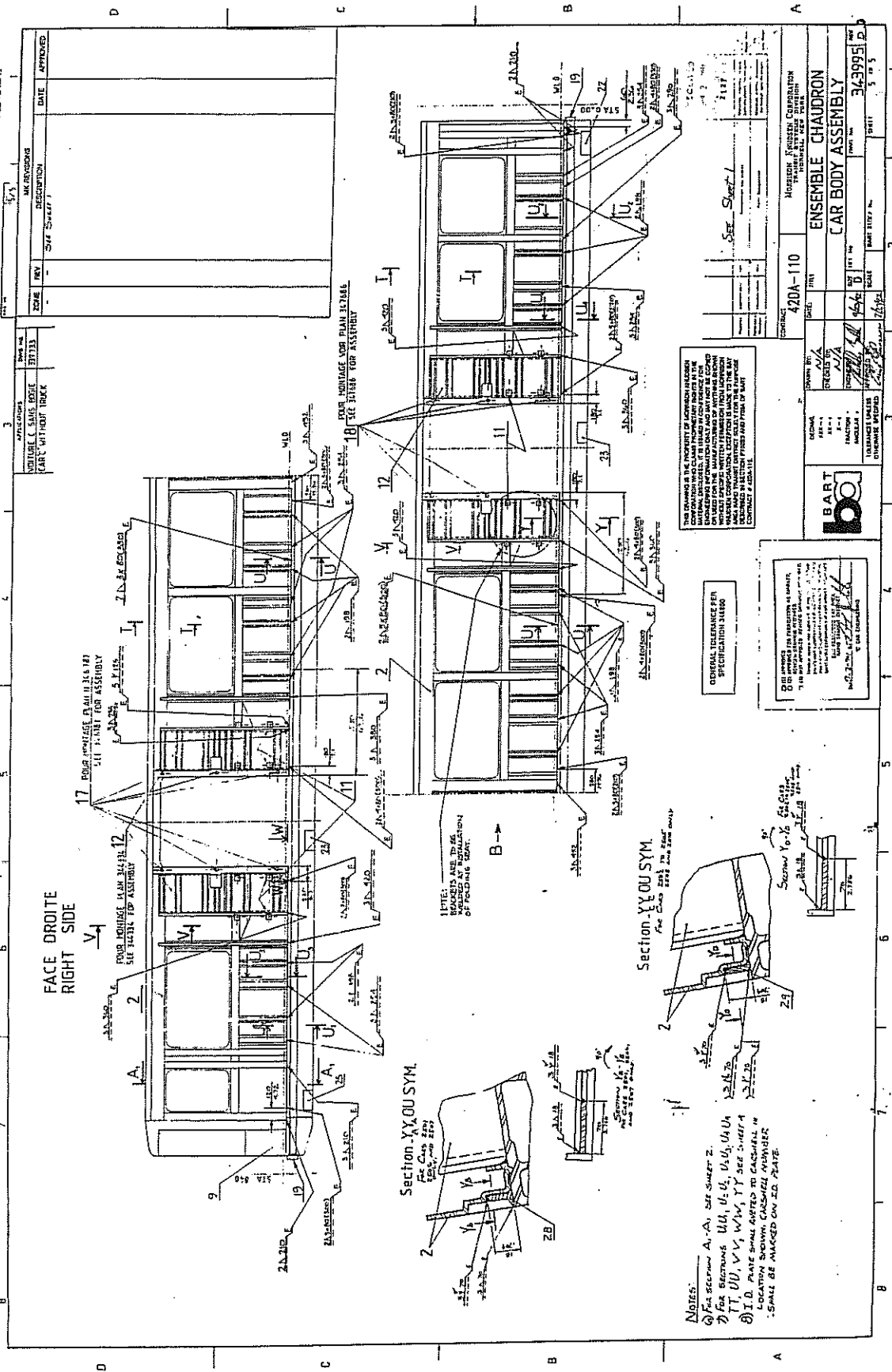
Weld symbols indicated by "W" are in accordance with AWS D11.2 and will be used for fabrication. AWS-719 may need to convert weld symbols from D11.2 to AWS.

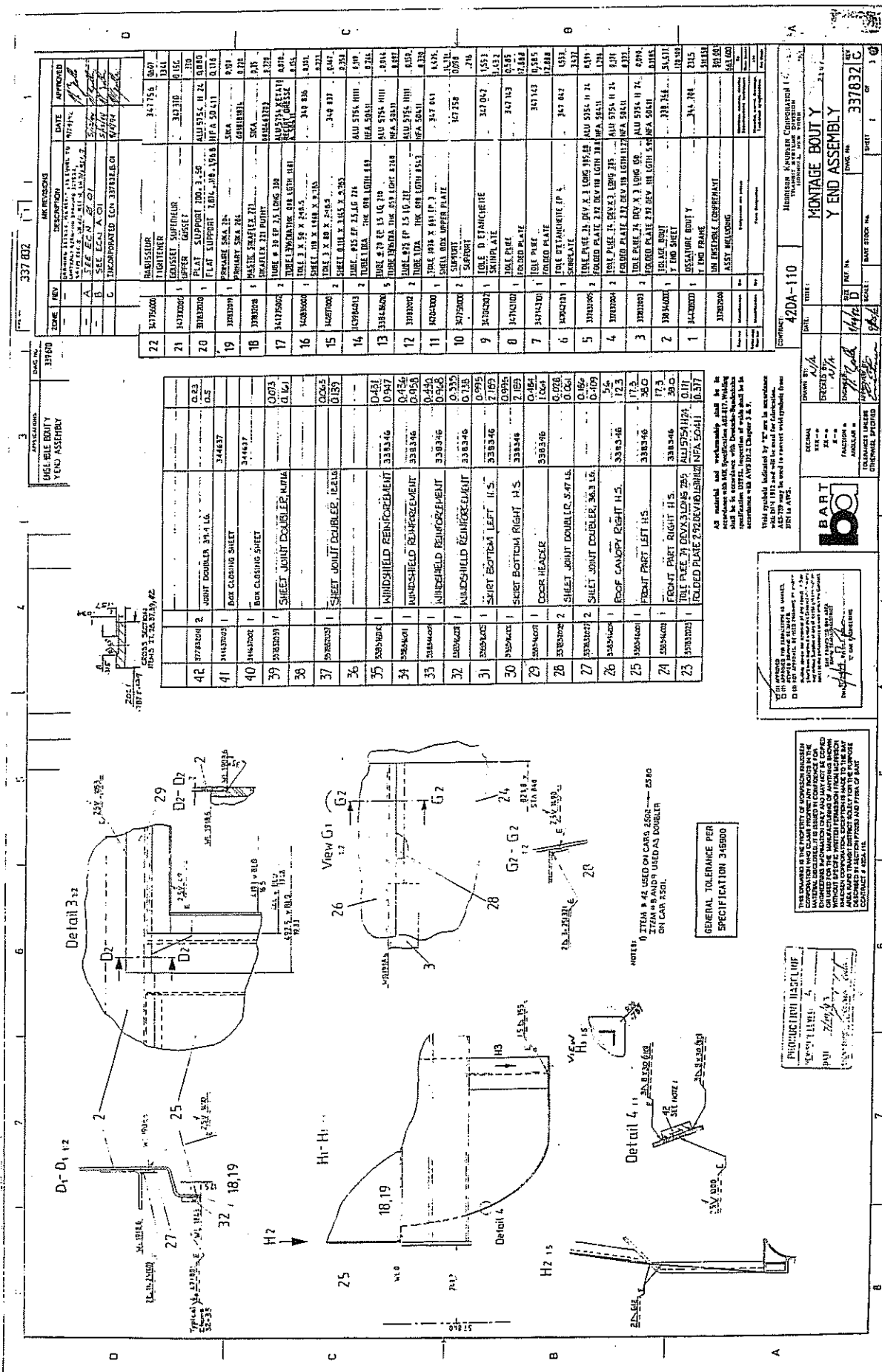
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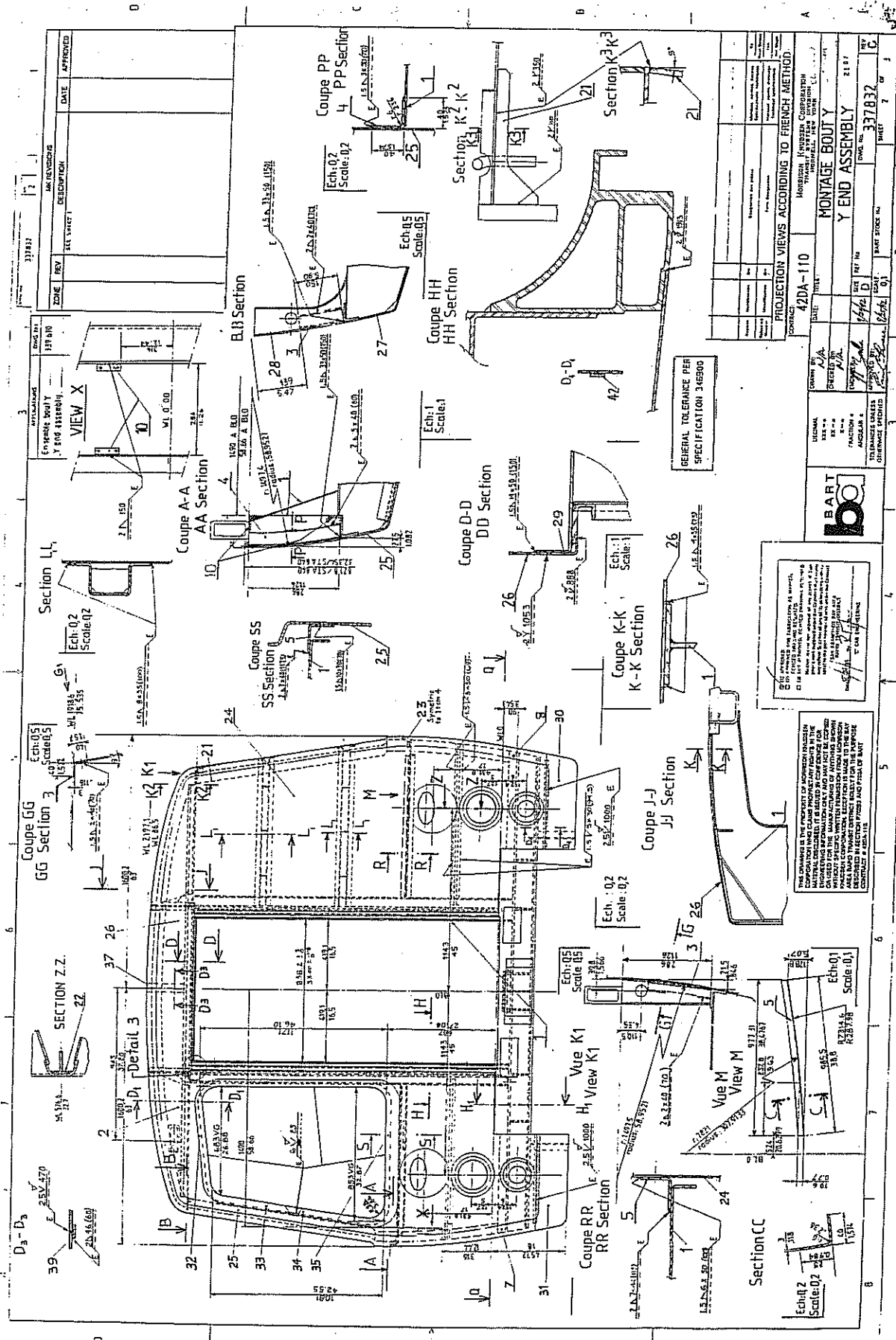




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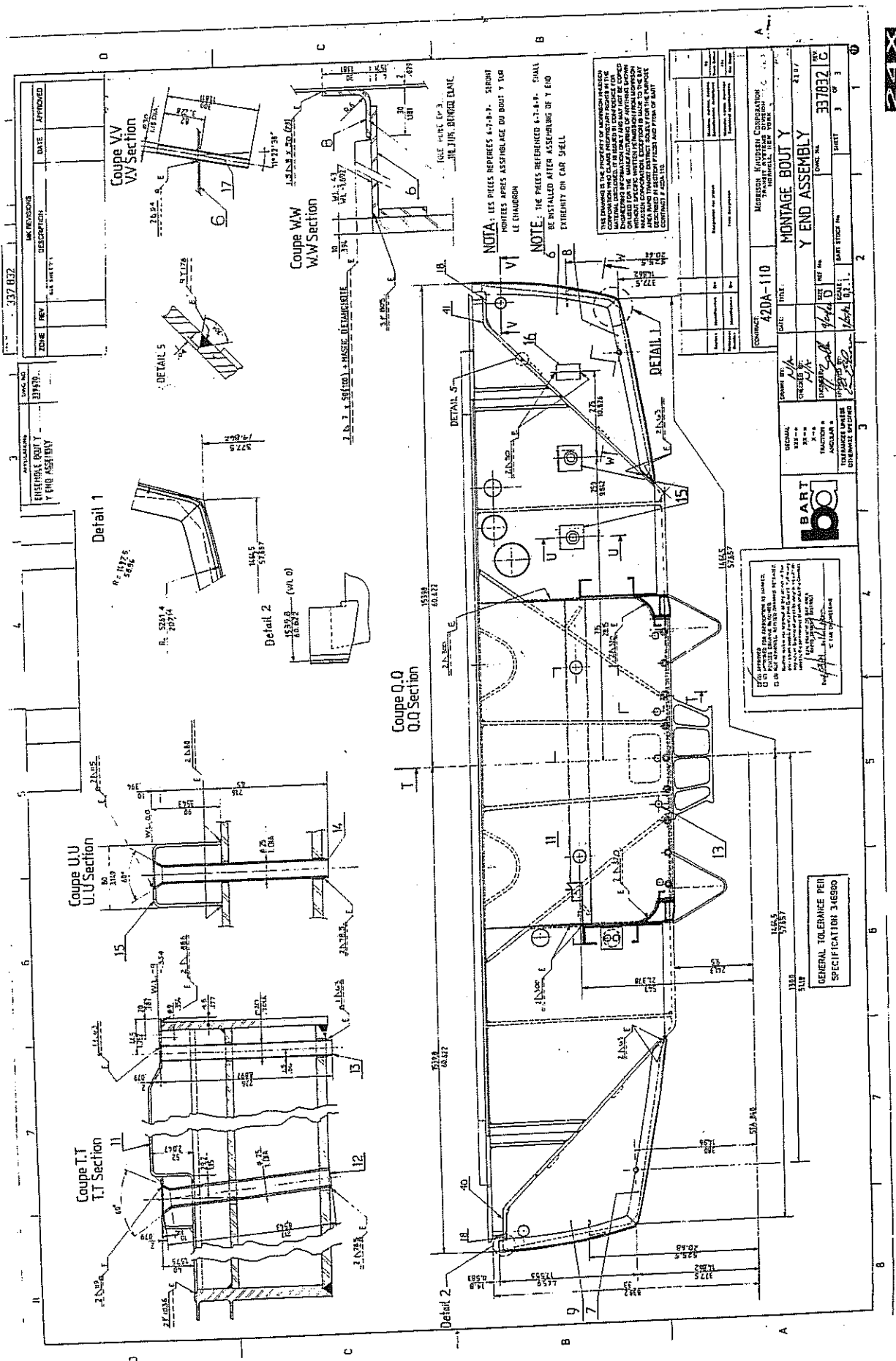


EXHIBIT “F”



EXHIBITATIVE DECISION DOCUMENT

GENERAL MANAGER APPROVAL:

GENERAL MANAGER ACTION REQ'D:

Approve and forward to Board

NARRATIVE:

PURPOSE: To obtain Board's approval to award the transit vehicle procurement Contract 42DA-110 to Morrison-Knudsen.

BACKGROUND:

In July, 1991, the Board by a two-thirds vote authorized the General Manager to procure transit vehicles by competitive negotiation under Public Contract Code, Section 20229.1. The award of the contract is subject to Board approval.

The negotiated procurement process generally includes the following stages: Request for proposals (RFP), evaluation of proposals for compliance with the requirements, ranking of the proposals, determination of proposals that are in competitive range, competitive discussions, refinement of requirements, best and final offers, evaluation of best and final offers, and recommendation of award.

The RFP was advertised on August 1, 1991 and proposals were received from Morrison-Knudsen, C.Itoh/Kinki-Sharyo, and Mitsui/Kawasaki on December 10, 1991. Technical proposals were evaluated by a technical evaluation committee and price proposals were evaluated by a separate price evaluation committee. Proposals with financing were evaluated separately from proposals without financing. The evaluation of proposals (Round 1) was completed December 30, 1991.

Clarification meetings were held with all proposers from January 20 to January 25, 1992. Written responses were also provided by all proposers in response to the District's questions for clarification. Re-evaluation of the proposals based on discussions and written responses were completed (Round 2) on January 28, 1992.

Second round of discussions and negotiations were held with all proposers from February 10 to February 15, 1992. As a result of this set of meetings, the District revised the contract requirements and a request for best and final offer (BAFO) was mailed to the proposers on February 20, 1992.

Best and final offers were received on March 2, 1992 and both the technical and price evaluations were completed the same day (Round 3). The two Committees were advised by the District's Office of the General Counsel and outside consultants.

Staff completed the evaluation of best and final offers (BAFO) and determined that Morrison-Knudsen ranks the highest.

0850

ROUTING NO.	PERSON	DUE DATE	INITIAL	DATE	PROPOSAL AFFECTS (CHECK ALL THAT APPLY):	COORDINATION TO COMPLETE ACTION (*X IF APPROVALS REQUIRED):
1.	Richard A. White		RAW	3/16	<input type="checkbox"/> OPERATING BUDGET <input type="checkbox"/> OPERATIONS	<input checked="" type="checkbox"/> AGM OPERATIONS <input checked="" type="checkbox"/> HUMAN RELATIONS AND SUPPORT SERVICES <input checked="" type="checkbox"/> GENERAL COUNSEL
2.					<input type="checkbox"/> CAPITAL BUDGET <input type="checkbox"/> MAINTENANCE	<input checked="" type="checkbox"/> AGM DEVELOPMENT <input type="checkbox"/> DISTRICT RELATIONS AND SUPPORT SERVICES <input checked="" type="checkbox"/> CONTROLLER TREASURER
3.					<input type="checkbox"/> CAPITAL PROGRAMS <input type="checkbox"/> ENGINEERING	<input type="checkbox"/> SAFETY AND INVESTIGATIONS
4.					<input type="checkbox"/> GOVERNMENT RELATIONS <input type="checkbox"/> PUBLIC INFO	
5.					<input type="checkbox"/> LABOR RELATIONS <input type="checkbox"/> PROCUREMENT	
6.					<input type="checkbox"/> AFFIRMATIVE ACTION <input type="checkbox"/> STAFFING	
7.					<input type="checkbox"/> SAFETY <input type="checkbox"/> CONSULTANTS	
8.					<input type="checkbox"/> LEGAL <input type="checkbox"/> OTHER	
9.						
10.						

PREPARED BY: Kris Hari
INITIAL: [Signature] DATE: 3/16/92

EXECUTIVE DECISION DOCUMENT

NARRATIVE CONTINUED:

Based on the need for transit vehicles to support extensions, patronage growth in the existing system and rehabilitation of A and B cars, and due to significant pricing advantage, 80 transit vehicles are recommended to be procured under this contract. Any options recommended to be exercised will be brought to the Board for approval.

SCHEDULE:

Eighty (80) vehicles are scheduled to be delivered by December, 1995. The delivery of all option vehicles, if exercised, will be completed by September, 1997.

DBE PARTICIPATION/DOMESTIC CONTENT/ANTI-APARTHEID CERTIFICATE

The domestic content (Buy America) is 79 percent of the total contract. The DBE percentage is 21 percent of the domestic content of the total contract. Morrison-Knudsen has certified that it is in compliance with the Comprehensive Anti-Apartheid Act of 1986

FUNDING:

The bid price for the procurement of 80 cars is approximately \$1.6 million per car, plus costs for other items such as engineering, tooling and testing; spare parts; special test equipment; publications and manuals, etc., resulting in a total bid price of \$141,600,052.

Funding for the procurement of 50 of these vehicles is programmed from approved funding sources for the blin/Pleasanton and West Pittsburgh Extensions Programs. These sources are expected to be available to meet contractual payment schedules. Funding for the procurement of the remaining 30 vehicles will be accomplished through either future capital grants or District operating funds. The possible capital funding sources for the 30 cars include the Warm Springs Extension Program, the San Francisco Airport Extension Program, or the A/B Car Rehabilitation Program. The amount of procurement funding currently not specifically identified for the 30 cars is approximately \$73 million, including financing costs. Should the previously identified or other capital funding sources not be available when the final car is delivered in late calendar year 1995, BART would be required to secure a financing instrument for \$73 million which will pledge BART operating revenues. Should this amount be financed over a 20 year basis, it is estimated that approximately \$7 million of BART's operating monies per year would be required to debt service this financing instrument. Details of any financing plan must be satisfactory to the Controller-Treasurer and the General Manager and approved as to form by the Office of the General Counsel before submission to the Board for approval.

It may be advantageous to the District to finance the construction costs of 80 cars on a short-term basis (May 1992 - January 1996). The estimated cost of such short-term financing in the amount of \$9,580,000 is included in the budget.

The total budget for the procurement is estimated to be as follows:

Procurement	\$141,600,052
Support Cost	25,500,000
(Sales Tax, Project Management,	
Contingency)	
Escalation	18,319,948
Financing	9,580,000
	<u>\$195,000,000</u>

EXECUTIVE DECISION DOCUMENT

NARRATIVE CONTINUED:

ALTERNATIVES:

Additional transit vehicles are needed in support of extensions, patronage growth in the existing system, and rehabilitation of A and B Cars. If these vehicles are not procured, load factors may reach unacceptable levels and the quality of service cannot be maintained. This alternative is not recommended. Also, to purchase 30 additional cars as an option rather than as part of the base contract would result in higher cost in the amount of approximately \$14.4 million, which is also not recommended.

RECOMMENDATION:

It is recommended that Contract No. 42DA-110, Procurement of Transit Vehicles, be awarded to Morrison-Knudsen, at a cost of \$141,600,052, exclusive of sales tax.

MOTION:

The General Manager is authorized to award Contract No. 42DA-110 to Morrison-Knudsen for the purchase of 80 transit vehicles for the bid price of \$141,600,050, exclusive of Sales Tax and other project costs, and subject to compliance with the protest procedures in the Contract Book. The General Manager is directed to report to the Board periodically regarding funding and financing methods for the 30 additional cars in the base order, and to obtain approval of the initial and any subsequent changes to such funding/financing plans.